Managing for New England Cottontail Rabbit Habitat in New York's Eastern Hudson Valley: Landowner Attitudes, Motivations, and Barriers

2014
HDRU Series No. 14-9

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HUMAN DIMENSIONS RESEARCH UNIT PUBLICATION SERIES

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TO CITE THIS REPORT

Allred, S., Stedman, R., Gary, G. and R. Parks. 2014. Managing for New England Cottontail Rabbit Habitat in New York's Eastern Hudson Valley: Landowner Attitudes, Motivations, and Barriers. Human Dimensions Research Unit Publ. Series 14-9. Dept. of Nat. Resources, Coll. Agric. and Life Sci., Cornell Univ., Ithaca, NY. 56 pp.

EXECUTIVE SUMMARY

Objectives and Methods

The primary objectives of this project were to: 1) understand how and why private forest landowners in New England cottontail (NEC) Focus Area in New York State (Westchester, Dutchess, Putnam, and Columbia Counties) manage their lands for wildlife habitat, specifically NEC habitat; 2) investigate what policy tools and design characteristics are most likely to encourage landowners to engage in NEC habitat management on private forestlands; and 3) provide recommendations that can inform the design of an incentive program that successfully engages landowners in NEC habitat management. The results and recommendations in this summary and report are specific to NEC habitat management on private land in the study area and do not necessarily apply to other regions.

A survey was developed and sent to a sample of 1,200 landowners between October and November 2013. The sample was drawn from 2011 tax code records obtained from the New York Department of Taxation and Finance Office of Real Property (ORP) Tax Services and included parcels of 10 or more acres. Based on ORP property classifications, parcels that were identified as wooded, large agricultural, or open land, and not in public or industrial ownership were included in the sample. The mail survey instrument was informed by the results of qualitative interviews with professionals that have expertise in NEC habitat management and landowner incentive programs in New York State. The survey questions asked specifically about landowner 1) attitudes toward and motivations for owning forest land, 2) interest in wildlife habitat management, past management activities, and likely future activities, and 3) preferences for habitat management incentive options. Of the 1,200 surveys mailed, 121 were undeliverable, 17 were refused, and 367 completed surveys were returned, for a response rate of 34%. A telephone follow-up survey was conducted with 50 nonrespondents to determine whether their answers to key questions differed from respondents. Differences between the two groups did not warrant weighting of the data.

Results – Respondent socio-demographics

There are regional variations in behavior, attitudes, and the likelihood of incentives to encourage habitat management for NEC in the study area. Respondents in Westchester and Putnam Counties: 1) are less likely to own land for hunting and fishing; 2) feel less strongly about woodland benefits for harvesting trees; 3) are less concerned with social norms, and; 4) are not as motivated by financial incentives as are respondents from Columbia and Dutchess counties.

Approximately three quarters of respondents see rabbits on their property and over half perceive that rabbit populations are decreasing or staying the same on their property. The majority of respondents feel that it is the responsibility of people who own wooded land to take care of it for future generations. Nature and aesthetic values are very important reasons for why landowners own woodland in the study area, while investment and

utilitarian (e.g., timber production, hunting, and fishing) reasons for owning land are far less important.

Three quarters of respondents do not belong to a wildlife conservation organization, and the majority of conservation organizations that respondents belong to in the study are "non-consumptive." The most common organizations that respondents belong to are: The Nature Conservancy (14%) and Audubon (9%). Some respondents have memberships with local organizations, such as the Dutchess Land Conservancy (9%), Columbia Land Conservancy (7%), and the North Salem Open Land Foundation (4%). Conservation organizations and the Department of Environmental Conservation (DEC) are the most important sources of habitat management information and support for respondents.

Results –Attitudes

Respondents view woodland benefits[1] as a more important reason to harvest trees than economic benefits[2]. These results highlight the need to emphasize the ecological, conservation, and aesthetic values of habitat management when communicating to landowners about management options, rather than economic benefits.

The majority of respondents feel positively towards managing their woodlands for NEC. Respondents believe that managing for NEC is most important to wildlife professionals (followed by importance to themselves and to their family and friends), which highlights the role that wildlife professionals, such as those in the NYSDEC, can play by encouraging landowner decision-making and behavior. It is very important to respondents that they retain power over the decisions made about their land. Program individualization, flexibility, goals, and enrollment simplicity are also very important characteristics of an incentive program targeted at specific habitat management actions.

Results – Land Management Practices

Many grassland owners in the study area hold positive attitudes (45%, positive or very positive) about growing old fields into forest. However, only 26% have allowed old fields to grow into forest as a habitat management practice in the past and 34% are likely or very likely to do it in the future. More research is needed to determine why this potential discrepancy in attitude and future behavioral intent exists. Overall, education and outreach incentives would encourage more grassland respondents to allow old fields to grow into forest than would financial incentives. Specifically, the highest percent of respondents indicated that DEC working on their land (21%, owning 987 acres) and expert advice (19%, owning 954 acres) would encourage them to allow old fields to grow into forest. While this result highlights the important role of wildlife professionals in

[1] Woodland benefits includes: harvesting trees is sometimes necessary for the ecological health of woodlands; harvesting trees can sometimes be good for a woodland; it is okay to harvest trees from private woodlands; when necessary, trees should be harvested from woodlands to prevent forest fires; harvesting trees from a woodland can improve habitat for wildlife; woodlands should be left untouched by humans

[2] Economic benefits includes: harvested trees should be used to produce products that humans can use; harvesting trees is sometimes necessary to provide economic profit to woodland owners; harvesting trees is good for the economy

educating and encouraging landowners, financial incentives may have an equally important role. Only 10% of respondents indicated that a rental rate would definitely encourage them to allow old fields to grow into forest, but that 10% owns 1019 acres of grassland.

Over half of woodland owning respondents area have positive attitudes (54%, positive or very positive) about cutting trees as a habitat management practice. However, only 16% of woodland owners have cut trees as a habitat management practice in the past, while 48% are likely to do it in the future. When presented with three financial incentive levels ($500, $750, and $1000 per acre), 29% of respondents (owning 3595 acres) in Westchester, Putnam, Dutchess, and Columbia Counties, NYS indicated that $1,000/acre would definitely encourage them to use cutting as a habitat management practice, which is the highest percentage among the three financial incentive levels. However, as a group, education and outreach incentives would definitely encourage more woodland owners than financial incentives to cut trees as a habitat management practice. The most powerful educational incentives to encourage cutting trees are expert advice from a wildlife professional (20%, 1691 acres) and technical assistance in writing a management plan (16%, 1421 acres).

Results - Barriers

No singular barrier stood out as a reason that prevents respondents from managing for New England cottontail habitat on their land in the study area. For nearly every barrier listed, the most responses were in the "neutral" range, perhaps because respondents may have not undertaken management for NEC in the past and may not have strong attitudes about what is preventing them from undertaking a behavior they have not thought much about.

Recommendations for Natural Resource Professionals on Connecting with Landowners about New England Cottontail Habitat Management in NYS:

The recommendations in this section are specific to New England cottontail habitat management on private land. Similar to the conclusions discussed above, recommendations are intended for the New England cottontail focus area in Westchester, Putnam, Dutchess, and Columbia Counties, NYS and do not necessarily apply to other regions.

1. Emphasize the ecological, conservation, and aesthetic values of habitat management when communicating to landowners in Westchester, Putnam, Dutchess, and Columbia Counties, NYS about land management options, rather than utilitaritian and/or economic benefits.

2. A successful habitat management incentive program should appeal to the specific motivations of private landowners in in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. As indicated in recommendation #1, the incentive program should appeal to the aesthetic and conservation values of land management and

emphasize the long-term benefits of managing for New England cottontail. Based on an understanding of landowners' wants and needs, agency personnel can work together and with conservation organizations to help ensure that an incentive program addresses those wants and needs. Such an understanding will also improve landowners' decision-making power about their lands.

3. Education and outreach incentive packages offered in Westchester, Putnam, Dutchess, and Columbia Counties, NYS could be very effective for encouraging landowners both to allow old fields to grow into forest and to cut trees as habitat management practices. Wildlife professionals, such as those in NYSDEC, play an important role in supporting and influencing landowner decision-making in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. NYSDEC should partner with conservation organizations (such as those listed in Figure 4) in communication and educational support to encourage landowners to manage their land for New England cottontail.

4. Financial incentive packages offered in Westchester, Putnam, Dutchess, and Columbia Counties, NYS should be offered at the highest amount possible for greatest success. Financial incentive packages for cutting trees as a habitat management practice are more likely to be successful if they are targeted at Columbia and Dutchess Counties.

5. Allow landowners in Westchester, Putnam, Dutchess, and Columbia Counties, NYS to retain decision-making power and flexibility over their land management decisions as a part of any incentive program that is offered to them. Resource professionals interviewed before the survey suggested reducing bureaucracy and "red tape" involved with landowner participation in programs.

ACKNOWLEDGEMENTS

We would like to thank Dan Rosenblatt, Mike Wasilco, Mark Kandel, Paul Novak, Marcelo Del Puerto, Steve Joule, and Matt Swayze from NYS Department of Environmental Conservation, who served as the Contact Team for this project. They provided much valuable guidance on the project objectives, methods, survey instruments, and presentation of results. We also greatly appreciate the time of the professionals and the landowners who responded to our interview requests and our surveys. Funding for this study was provided by the New York Federal Aid in Wildlife Restoration Grant WE-173-G-19.

Interview transcriptions were completed by Carol Cook. Mail survey implementation was undertaken by Nancy Connelly and Karlene Smith of the Cornell University Human Dimensions Research Unit (HDRU). Phone survey implementation was conducted by the Survey Research Institute (SRI) at Cornell University.

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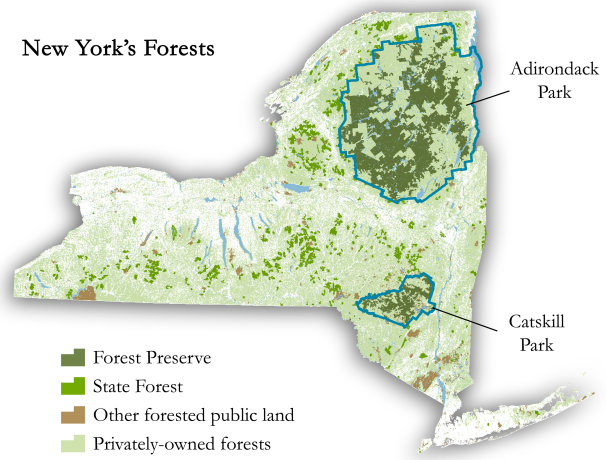
INTRODUCTION

Across New York State (NYS) and throughout the Northeastern United States, early successional forest habitats (ESH), and the species reliant on ESH, have declined due to development, reversion of agricultural land, and other changes in land use (USFWS 2011). Early successional forest habitats are areas with persistent shrubs or seedling to sapling-sized trees that are typically created as a response to a disturbance (Litvaitis 2001, Thompson and DeGraaf 2001). Active forest management can create ESH in areas where natural disturbances no longer produce enough ESH for wildlife dependent upon it. In some areas that are increasingly privatized, it is becoming more difficult to find ESH.

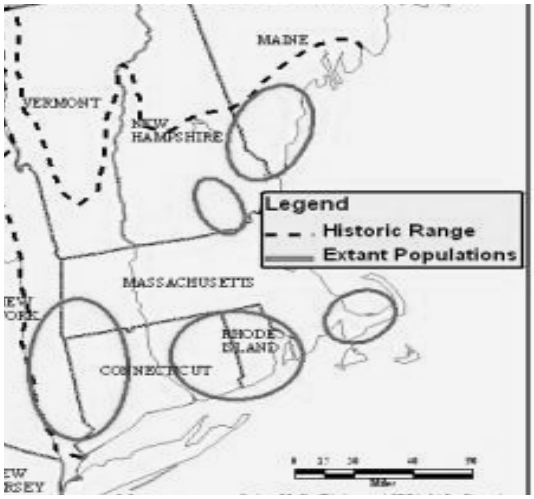
Eighty percent of forestlands in NYS are privately owned (Widmann 2012; see Figure 1), making private landowners in NYS essential to ESH creation and to the maintenance of species reliant on ESH, such as *Sylvilagus transitionalis*, or New England cottontail (NEC). To engage landowners in habitat management programs, it is critical to understand what policy instruments and incentives will be most effective encourage necessary management actions, what barriers exist to private landowners managing their lands, and how to overcome these barriers.

Figure 1. Map of publicly and privately owned forestland in New York State (NYSDEC 2014)



In NYS, more than 30 (about 6%) Species of Greatest Conservation Need, including NEC, require ESH for survival (Litvaitis 2001). Over the last several decades there has been a dramatic reduction in the amount of ESH throughout the state. Development, changes in land use, selective harvesting, fire suppression, and the natural maturation of forests have caused the amount of ESH across NYS to decrease from 45% in 1968 to just 10% in 2006 (Litvaitis 2001, Dayer et al. 2011). The decline in such habitat has been detrimental to species that depend upon ESH, particularly NEC. Since the 1960's, the NEC range has decreased by roughly 86%, a decline due almost entirely to loss of habitat (USFWS 2011) (*see* Figure 2). As a result, the species is being considered a candidate for inclusion on the Endangered Species List (Rodewald and Vitz 2005).

Figure 2. Historic range of New England cottontail compared with extant populations (USFWS 2011)



Active forest management can generate ESH. The low aesthetic value of ESH, the cost, and the time involved in management, makes encouraging management for ESH on private lands difficult (Gobster 2001, Harper 2007). In other states, management efforts are focused on maintaining shrubland and on increasing ESH parcel size. However, the extent of privately owned forestland in NYS requires incentives to private landowners to engage in this type of habitat management (Fink et al. 2006, Rodewald and Vitz 2005).

The range of NEC in NYS is almost exclusively in the Hudson Valley region, an area characterized by above average wealth and distinctive demographics from the rest of the state. The median income in the Hudson Valley is roughly 172% that of the rest of NYS, and poverty rates in the region are 4 to 6 percent lower (U.S. Census Data 2000). As a result, landowners in this region may have different land ownership and management motivations than other areas of NYS. Successful incentive packages to encourage wildlife habitat management in this region will require careful consideration of the specific needs and wants of the landowners in the region.

Policy Tools and Incentive Programs

Many policy tools can be useful in providing incentives for private landowner management behavior. Research literature provides key characteristics of effective policy design (Table 1), which include: 1) providing a combination of different policy tools; 2) consistency of the tools used to achieve objectives; 3) flexibility of program requirements, and; 4) understanding and tailoring programs to landowner needs. Effective policy tool designs allow landowners to maintain decision-making power and use education regarding program objectives and benefits to landowners.

A number of landowner incentive programs aimed at different species and habitat types already exist in New York State. Some of the programs offer incentives for NEC habitat management, but are primarily focused on financial incentives. There have been a number of critiques of existing incentive programs. One critique is the duration of the programs. The complexity of the

programs has also been a criticism, as well as the limited payment and inability of agencies and organizations to solicit participation from landowners (del Puerto 2012). These critiques illustrate some of the barriers to incentive programs, provide insight into how to develop a more successful incentive program, and also highlight that none of these programs are specifically targeted at landowner needs, motivations and values. In order to address the lack of information about landowner motivations in the Eastern Hudson Valley, gathering human dimensions data about land ownership and management goals, as well as barriers to management, may be useful for overcoming these critiques and creating an effective program that will incentivize private forest landowners to manage for NEC habitat.

Table 1. Characteristics of effective policy tools with supporting literature

Characteristic	Description	Supporting Literature
Hybridity	Providing a combination of different policy tools	Goulder and Parry (2008)
Consistency	Goals and objectives are applied consistently (from macro goals, to on-the-ground measures)	Howlett (2009); Cashore and Howlett (2007)
Flexibility	Offer different levels or requirements for incentives or regulations based on individual or group characteristics	Goulder and Parry (2008)
Tailoring	Tailor policy to specific landowner values and needs	Daley et al. (2004); Joshi and Arano (2009)
Landowner decision-making power	Individuals actively involved in decision-making re: ecosystem management	Creighton et al. (2002); Stevens et al. (2002); Weber (2000)
Education	Personal attainment and education by professionals re: how and why to manage forest	Serbruyns and Lussayert (2006); Dayer et al. (2011)

Research Objectives

The primary objectives of this project were defined by the project Contact Team, which is composed of NYSDEC Bureau of Wildlife and Lands and Forest staff and Cornell University researchers. The three objectives were:

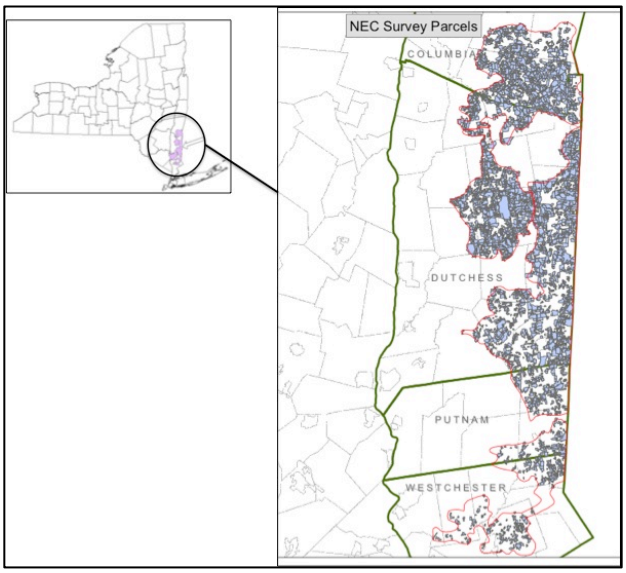
1. Understand how and why private forest landowners in Westchester, Dutchess, Putnam and Columbia Counties of NYS manage their lands for wildlife habitat, specifically NEC habitat, including land management behavior, and attitudes, knowledge, motivating factors, and constraints for different types of forest management practices on their lands.
2. Investigate what incentives are most likely to encourage landowners in the study area to engage in NEC habitat management on private forestlands.
3. Provide recommendations that can inform the design incentive programs in the study area that successfully engage landowners in NEC habitat management.

METHODS

We used qualitative and quantitative research methods to gain an in-depth understanding of how and why private forest landowners in the NYS NEC focus area (Westchester, Columbia, Duchess and Putnam Counties, Figure 3) might participate in wildlife habitat management incentive

programs. All of the research was reviewed, under protocol 1008001625, by the Cornell University Office of Research Integrity and Assurance and qualified for Exemption from the Institution Review Board. In 2013, we conducted interviews with 13 professionals who have expertise in NEC habitat management and landowner incentive programs in NYS. We chose this qualitative method (Patton 2002) because interviewees can provide insight and nuanced information as to what, from their perspective, motivates landowners to manage their private woodlands for wildlife habitat in the study area, and what barriers are present to such management.

Figure 3. New England cottontail focus area in New York State



The interviews informed the subsequent design of the questions and response options for a mail survey to landowners in the study area (See Appendix A for complete interview results). The interviews highlighted motivations and barriers that NEC professionals perceive for landowners to enroll in habitat management programs. Motivations were largely focused on nature and wildlife recreation, while the barriers are widespread, including bureaucratic barriers, regional barriers, cost (i.e., cost of doing business, cost of owning land in the area), maintenance of the habitat, and resistance to cutting trees. Therefore, education was seen as a broad-ranging solution to a wide collection of potential obstacles.

The results of the interviews also suggest that simplifying incentive programs and program enrollment should be explored. Results also revealed the potential utility of using a combination of financial and educational incentives to improve the efficacy of habitat management programs. Education can help promote general knowledge and awareness about practices, available programs, and wildlife species. Financial incentive tools could help overcome barriers such as cost and lack of access to equipment. However, financial incentives must pay enough to cover costs and continued maintenance of a project.

We conducted a mail survey of a random sample of landowners in the NYS NEC focus area (Columbia, Dutchess, Putnam, and Westchester Counties). The study population was defined as landowners in the focus area that own parcels of at least 10 acres. We drew the sample from

2011 tax records obtained from the New York Department of Taxation and Finance Office of Real Property (ORP) Tax Services. The selection of survey recipients was limited to parcels with Office of Real Property (ORP) property tax codes that include, or are likely to include, private woodland landowners: agricultural vacant land (ORP code 105), rural residence with acreage (ORP code 240), other rural vacant lands (ORP code 323), and private wild and forest lands (ORP code 910). For a more complete explanation of how properties within these codes are defined, see: http://www.orps.state.ny.us/assessor/manuals/vol6/ref/prclas.htm.

The survey instrument asked specifically about landowner 1) attitudes toward and motivations for owning forest land, 2) interest in habitat management, past management activities, and likely future activities, and 3) preferences for land management incentive options. See Appendix B for exact content and wording of the survey. Data were collected in October and November, 2013 using mail-back questionnaires in four waves of mailings: cover letter and questionnaire, reminder letter, cover letter and replacement questionnaire, and a reminder letter. A telephone survey to non-respondents was administered by the Survey Research Institute at Cornell University (SRI) to a random sample of 50 nonrespondents in an effort to identify any non-response bias. If the two groups differed substantially, it would be necessary to weight the mail survey data to ensure the results would be representative of the population. Data collection for the telephone survey was conducted during December 2013. The telephone survey included a subset of variables from the mail questionnaire to compare respondents and non-respondents:

- Attitude towards managing for NEC
- Number of parcels owned
- Total acres owned
- Wooded acres owned
- Grassland acres owned
- Number of years owned land
- Number of miles lived from land
- Membership in a wildlife conservation organization
- Gender
- Age
- Education

Data were analyzed using SPSS (a statistical package for social sciences). T-tests were used to test for significant differences between the telephone non-response survey and the mail survey responses. Chi-square, t-tests, and Analysis of variance (ANOVA) tests were used to test for significant differences among responses. Factor analysis (principal components analysis with varimax rotation) and reliability tests (Cronbach's alpha) were used to categorize reasons for owning woodlands and attitudes towards harvesting trees.

RESULTS

Of 1,200 addresses that were sent a survey, 367 individuals completed a survey. After accounting for undeliverable (n=121) and refused (n=17) surveys, the adjusted response rate was 33.9%. In general, our analysis revealed that nonrespondents and respondents are very similar, differing significantly only on attitude towards management and respondent age. The

respondents of the mail survey are significantly younger than respondents of the phone survey (birth year 1951 versus 1946). Mail survey respondents hold significantly more positive attitudes about managing their woodlands for NEC than the respondents of the phone survey (3.9 versus 3.4 on scale of 1-5). However, even though the differences in means for those two questions are statistically significant, we do not consider the practical differences enough to merit weighting the data.

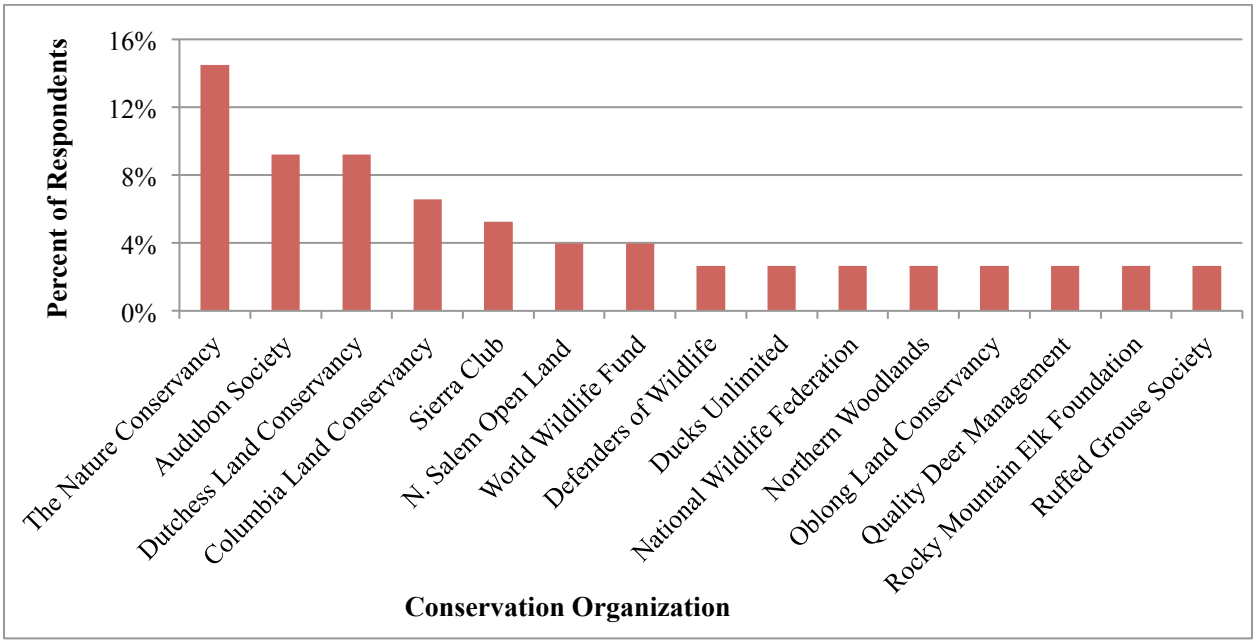
Characteristics of Respondents and Their Properties

Mail survey respondents (here after, respondents) range in age from 20 to 97, with a mean age of 63. More respondents are male (55%) than female (44%). Sixty-six percent have a college undergraduate degree (Bachelor's) or higher. Sixty-seven percent live on or within one mile of their Eastern Hudson Valley property, with the maximum distance lived from the property being 2500 miles. The majority of respondents own 1 parcel, while the median number of acres is 27 (range = 3 to 4,705 acres). The median number of wooded acres owned is 15 (range = 0 to 600), while the median number of grassland acres owned is 8 (range = 0 to 450). Respondents have owned their property for a median of 19 years (range = 1 to 92 years).

Seventy-five percent of respondents see rabbits on their property. Responses differ greatly in perception of whether the number of rabbits on the property in the past five years has increased (19%), decreased (36%) or stayed the same (28%), while 17% did not know. The variations in these responses may be due to difficulty recalling the number of rabbits seen in the past 5 years or because local (parcel-sized) rabbit populations can vary dramatically from year to year.

Respondents feel that it is the responsibility of people who own wooded land to take care of it for future generations (mean = 4.5 on a 5-point scale where 1 = strongly disagree to 5 = strongly agree). Twenty one percent of respondents belong to a wildlife conservation organization. The most common organizations that respondents belong to are The Nature Conservancy (14%) and the Audubon Society (9%) [Figure 4]. Several respondents have memberships with local or regional land trusts, such as the Dutchess Land Conservancy (9%), Columbia Land Conservancy (7%), and the North Salem Open Land Foundation (4%).

Figure 4. Memberships of respondents in wildlife conservation organizations



Motivations for Owning Wooded Property

Using factor analysis, we identified two factors (woodland retreat and utilitarian) that explain why people own their woodland property. The item "investment" did not load on either factor and was treated as a single item. These components explain 60% of the variance in reasons for owning wooded property and had a high reliability (woodland retreat Cronbach's alpha = 0.81; utilitarian Cronbach's alpha = .79). Many respondents identified nature and aesthetic values such as to enjoy scenery (56%), to protect nature (43%), and to provide a place for wildlife to live (41%) as being very important reasons to own woodland (Table 2).

Table 2. Motivations for owning woodland

Motivations for owning woodland	Mean Agreement* (% "strongly agree")
Component 1: Woodland Retreat	4.2
To enjoy scenery	4.5 (56%)
For privacy	4.4 (53%)
To protect nature	4.2 (43%)
To provide a place for wildlife to live	4.2 (41%)
For birding/bird watching	3.8 (27%)
Component 2: Investment	3.3 (15%)
Component 3: Utilitarian	2.9
To pass on to heirs	3.5 (25%)
For hunting or fishing	3.0 (20%)
For farming	3.0 (12%)
For production of timber products for family use	2.8 (11%)
For non-timber forest products	2.6 (5%)
For production of timber products for sale	2.4 (3%)

*Agreement was measured on a 5-point scale where 1 = strongly disagree to 5 = strongly agree

Woodland Management Attitudes and Motivations

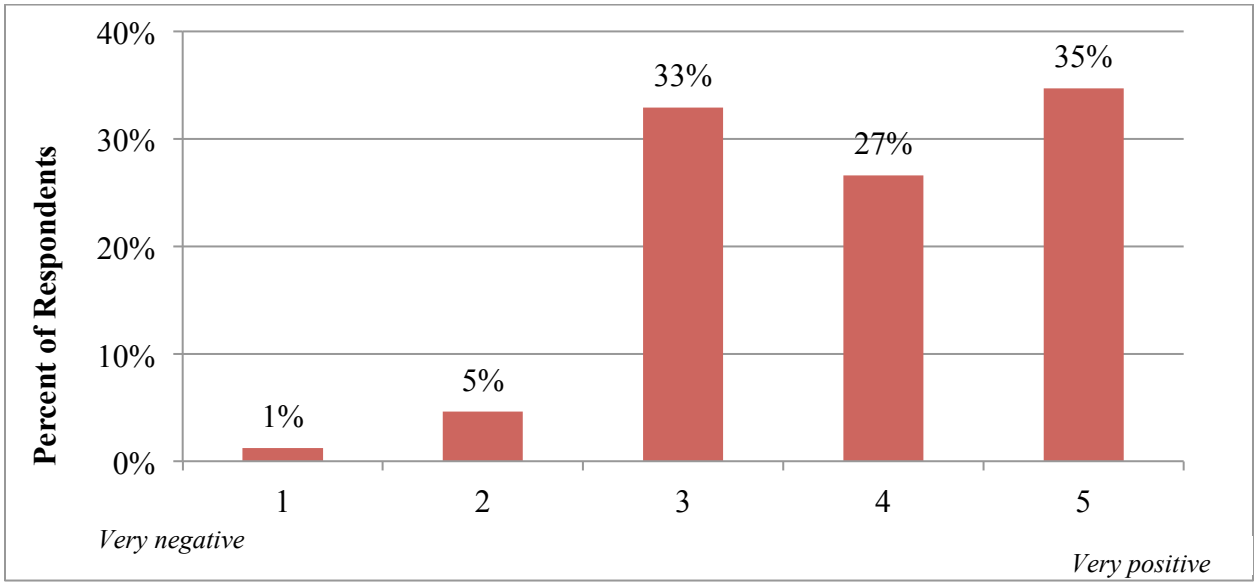
Respondents have strong opinions about the importance of various incentive program characteristics (Table 3). Most notably, it is very important to 88% of respondents that they retain power over decisions made about their land. Program individualization (63%) and flexibility (60%) are also very important. More than half of respondents feel it is very important that their land management goals align with the greater goal of wildlife conservation and that the program enrollment process be simplified.

Table 3. Importance of incentive program characteristics

Program Characteristic	Not Important	Of little Importance	Somewhat Important	Very Important
Retain power over decisions about your land	3.6%	1.2%	7.3%	**87.9%**
Program is tailored to my needs and motivations for owing woodland	3.7%	7.0%	26.2%	**63.1%**
Flexibility of the program	3.7%	4.9%	31.1%	**60.4%**
Your land management goals align with the greater goal of wildlife conservation	5.5%	4.0%	36.2%	**54.4%**
Simplicity of the enrollment process	6.7%	6.4%	36.9%	**50.0%**

Respondents have generally positive attitudes towards managing their woodlands for NEC (mean = 3.9 on a 5-point scale where 1 = very negative to 5 = very positive), with only 1% having a very negative attitude. Thirty-five percent of respondents have a very positive attitude towards NEC habitat management (Figure 5).

Figure 5. Attitudes towards managing for New England cottontail habitat



Using factor analysis, we identified two factors, "woodland benefits" and "economic benefits" that explain respondent attitudes about harvesting trees (Table 4). The two factors explain 56% of the variance in attitudes towards harvesting trees and had a high reliability (woodland benefits Cronbach's alpha = 0.79; economic benefits Cronbach's alpha = 0.71).

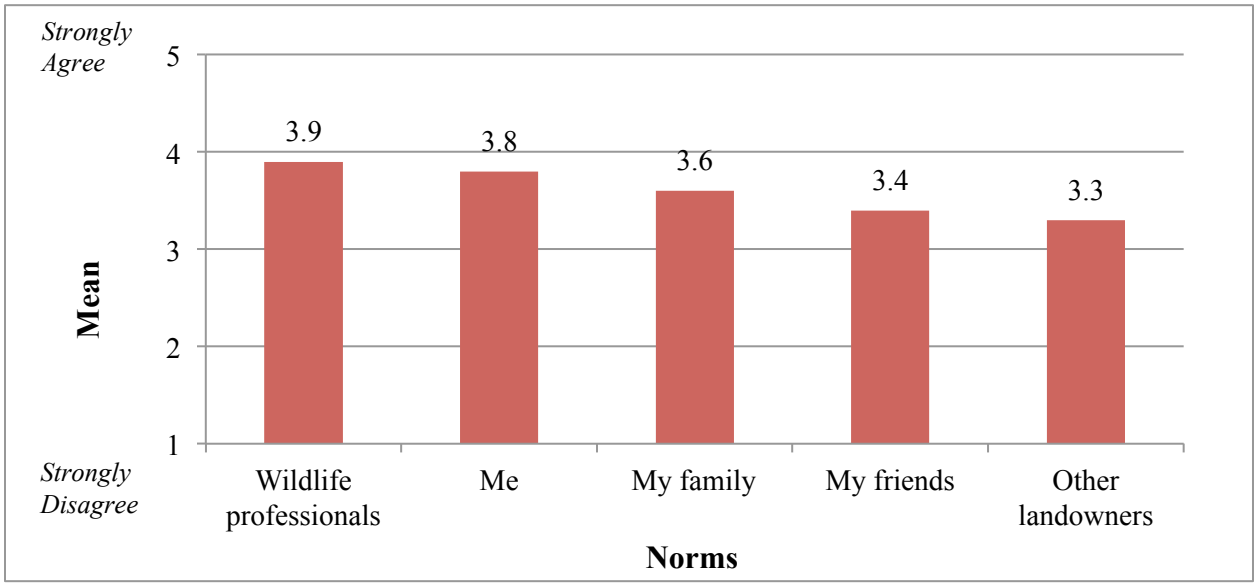
Table 4. Attitudes towards harvesting trees as a habitat management practice

Reasons for harvesting trees	**Mean Agreement* (% indicating "strongly agree")**
Woodland Benefits	3.9
Harvesting trees is sometimes necessary for the ecological health of woodlands	4.2 (38%)
Harvesting trees can sometimes be good for a woodland	4.1 (25%)
It is okay to harvest trees from private woodlands	3.8 (27%)
When necessary, trees should be harvested from woodlands to prevent forest fires	3.8 (21%)
Harvesting trees from a woodland can improve habitat for wildlife	3.7 (18%)
Woodlands should be left untouched by humans	2.4 (3%)
Economic Benefits	3.5
Harvested trees should be used to produce products that humans can use	3.6 (14%)
Harvesting trees is sometimes necessary to provide economic profit to landowners	3.5 (12%)
Harvesting trees is good for the economy	3.3 (8%)

*Agreement was measured on a 5-point scale where 1 = strongly disagree to 5 = strongly agree.

In general, societal norms (beliefs about how members should behave in a given context) about managing for NEC are important to respondents. Respondents agree that managing for NEC and other wildlife is important to wildlife professionals (71% agree or strongly agree [see Figure 6]), while 67% agree or strongly agree that managing for NEC is important to them.

Figure 6. The importance of societal norms in managing for New England cottontail habitat. The question began with the phrase: "Managing for New England cottontail and other wildlife habitat is important to…"



Habitat Management Practices and Incentives

Allowing Old Fields to Grow into Young Forest as a Habitat Management Practice

For the purposes of this study, allowing old fields to grow into young forest refers to landowners allowing fields to grow into brush or allowing brush to remain. This practice involves retiring an old field for a period of roughly 20 years, and may include scattered planting of shrubs. Eighty-five percent of respondents reported owning one or more acres of grassland. Only the answers of respondents with at least one acre of grassland are included in the analyses for this habitat management practice. Grassland owners hold slightly positive attitudes about the growing old fields into forest (mean = 3.3 on a 5-point scale [see Figure 7]). However, only 26% have allowed old fields to grow into forest as a habitat management practice in the past. Overall, respondents are unlikely to allow old fields to grow into young forest as a habitat management practice in the future (mean = 2.8 on a 5-point scale [see Figure 8]).

Figure 7. Attitudes towards allowing old fields to grow into young forest as a habitat management practice

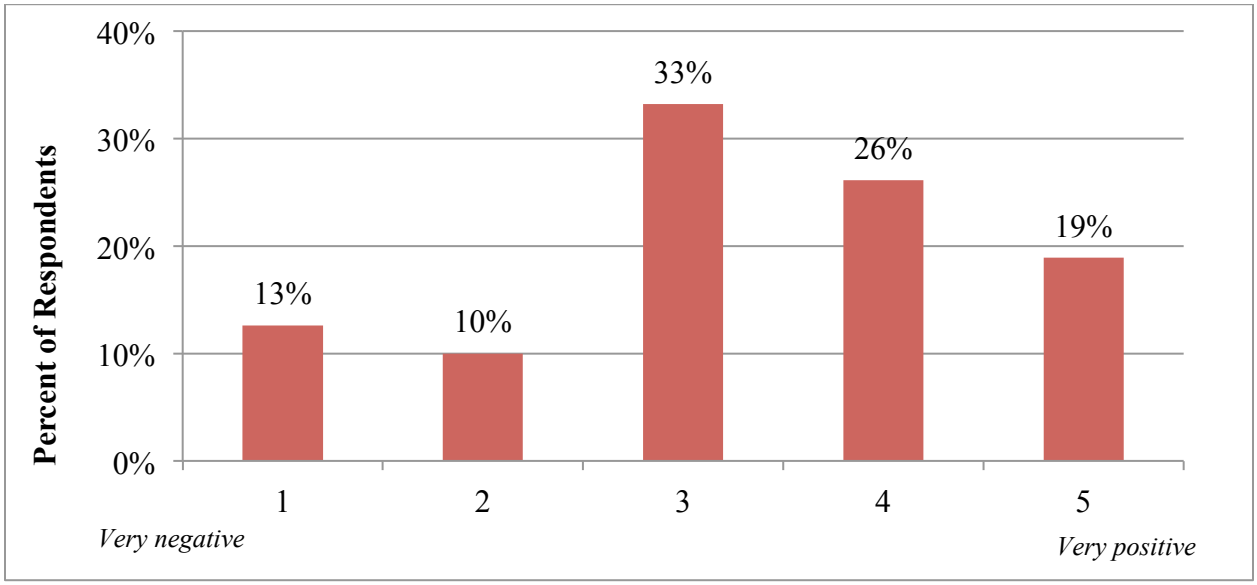
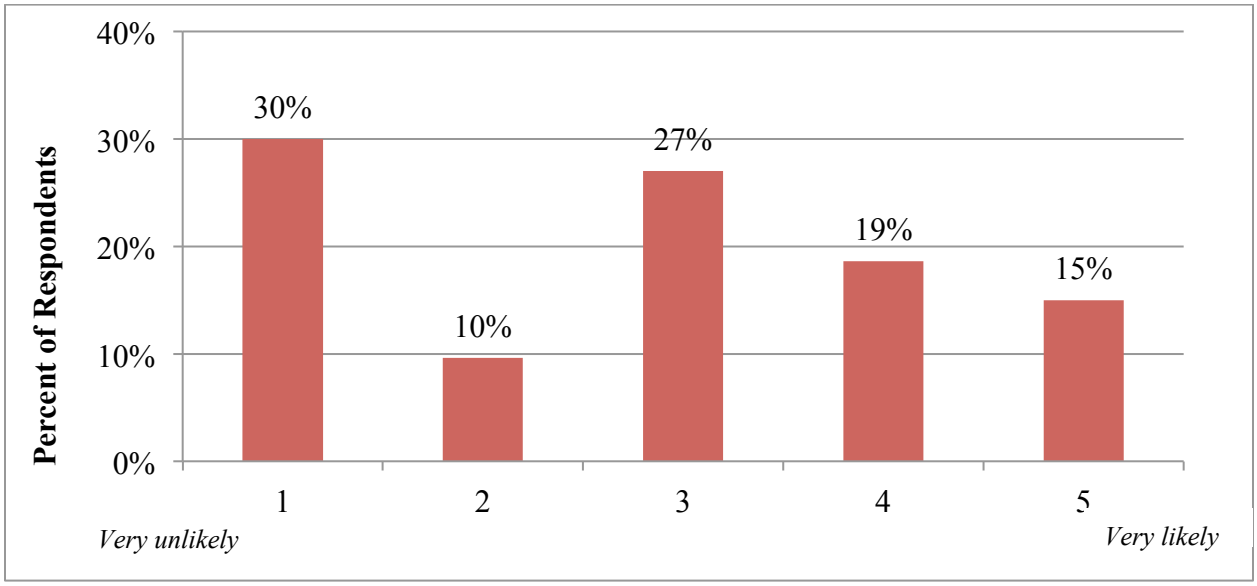


Figure 8. Likelihood of respondents to allow old fields to grow into forest as a habitat management practice



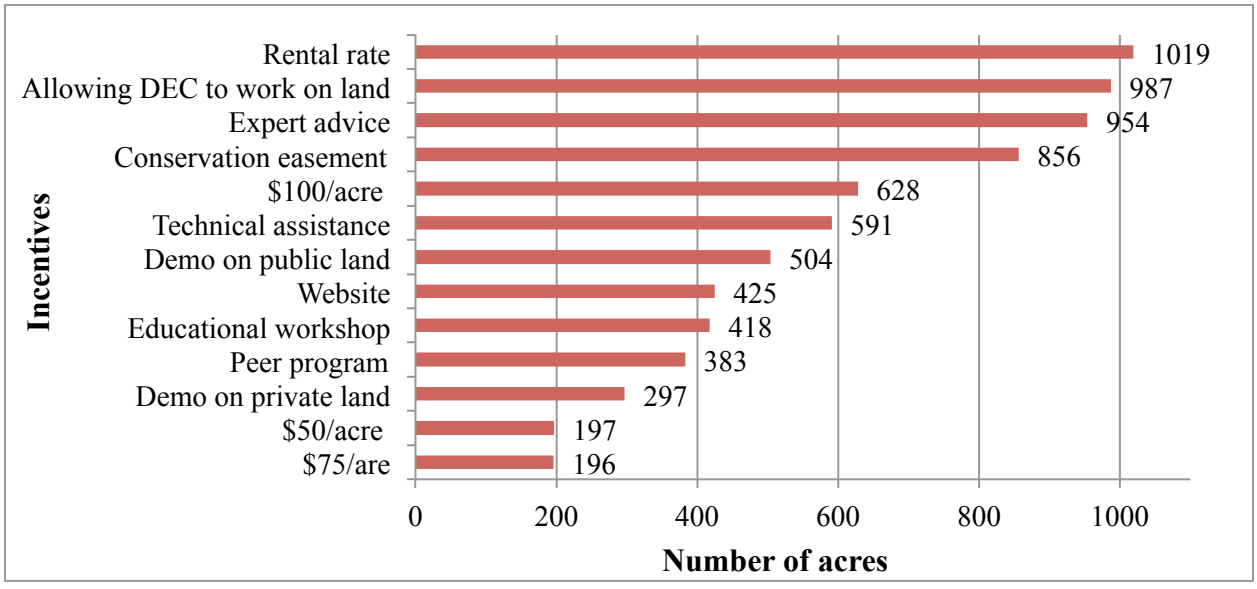
Incentives to Allow Old Fields to Grow into Young Forest as a Habitat Management Practice

Two types of incentives (education and outreach incentives and financial incentives) explain what might encourage landowners to allow old fields to grow into forest as a habitat management practice. The incentives that definitely would encourage most respondents to perform this type of habitat management are: expert advice from a wildlife biologist or other professional (21%), allowing DEC or partners to perform work on your land at no cost to the landowner (19%), and a conservation easement (15%) [Table 5]. However, the 21% of respondents that indicated expert advice definitely would encourage them owns a total of 954 acres, while the 10% of respondents that indicated a rental rate definitely would encourage them owns a total of 1019 acres (Figure 9). Furthermore, allowing DEC or partners to perform work on your land at no cost definitely would encourage 19% of respondents (Table 5) who own a total of 987 acres (Figure 9). Therefore, it is important to understand how many landowners each incentive is likely to encourage as well as how many acres those landowners own.

Table 5. Likelihood of incentives to encourage respondents to allow old fields to grow into young forest as a habitat management practice

Incentives	% of respondents who indicated "definitely would encourage*"
Education and outreach incentives	
Expert advice from a wildlife biologist or other professional	21%
Allowing DEC or partners to perform work on your land at no cost to you	19%
Technical assistance in writing a wildlife management plan	14%
A demonstration area showing the practice on public land	13%
A demonstration area showing the practice on private land	12%
NewEnglandcottontail.org website or other online resources	11%
Educational workshop about allowing old fields to grow into young forest	10%
A peer program where you would learn from other landowners	10%
Financial incentives	
Conservation easement	15%
Financial incentive that pays landowner about $100/acre	14%
Rental rate based on agricultural potential of the land	10%
Financial incentive that pays landowner about $75/acre	6%
Financial incentive that pays landowner about $50/acre	6%
*Encouragement was measured on a 5-point scale where 1 = makes no difference to 5 = definitely would encourage	

Figure 9. Total number of grassland acres owned by respondents that definitely would be encouraged by incentives to grow old fields into young forest. Acreages are not mutually exclusive; respondents may have indicated that more than one incentive definitely would encourage the management practice.



Cutting Trees as a Habitat Management Practice

For the purposes of this study, cutting trees involves removing trees with the intention of forest betterment, or added benefit to wildlife, and typically focuses on increasing light penetration to the forest floor for increased understory growth by overstory removal. It could also involve patch cuts (clearing small portions [minimum of 3-5 acres] of forest) to allow trees to grow back (regeneration). Patch cuts create habitat for American Woodcock, Ruffed Grouse, New England cottontail, Golden Winged Warbler and other wildlife. Ninety-one percent of respondents reported owning one or more acres of woodland, and only the answers of respondents with at least one acre of woodland are included in the analyses for cutting trees.

Woodland owners have positive attitudes about cutting trees (mean = 3.6 on a 5-point scale [see Figure 10]). However, only 16% of woodland owners have cut trees as a habitat management practice in the past, while 75% have not cut trees as a habitat management practice and 9% are not sure if they have. Woodland owners are moderately likely to cut trees as a habitat management practice in the future (mean = 3.3 on a 5-point scale [Figure 11]).

Figure 10. Attitudes towards cutting trees as a habitat management practice

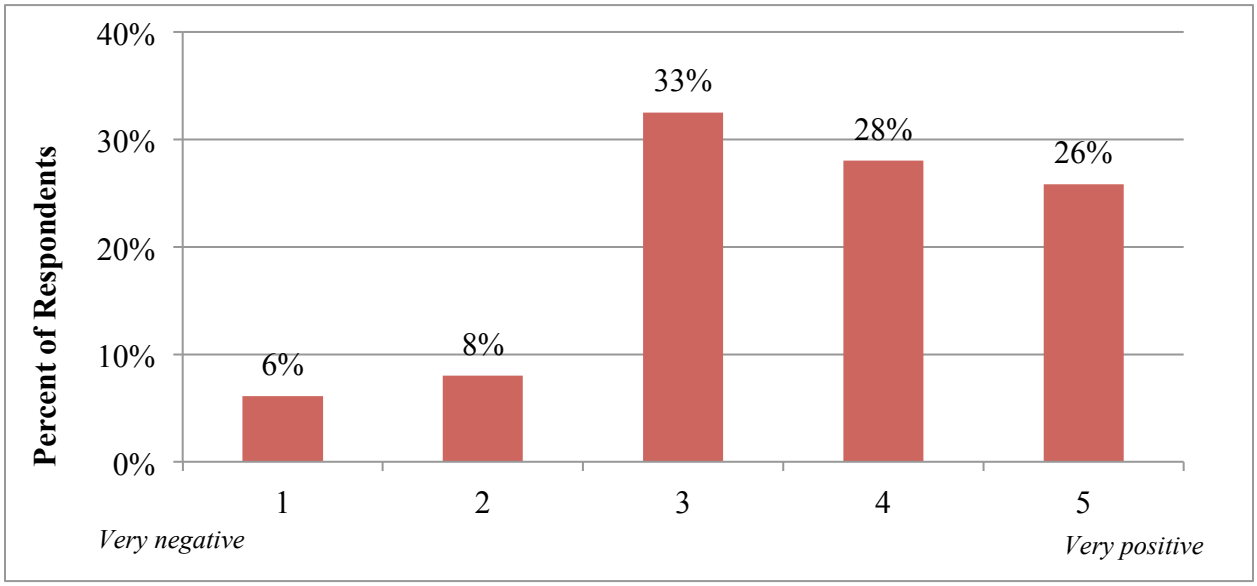
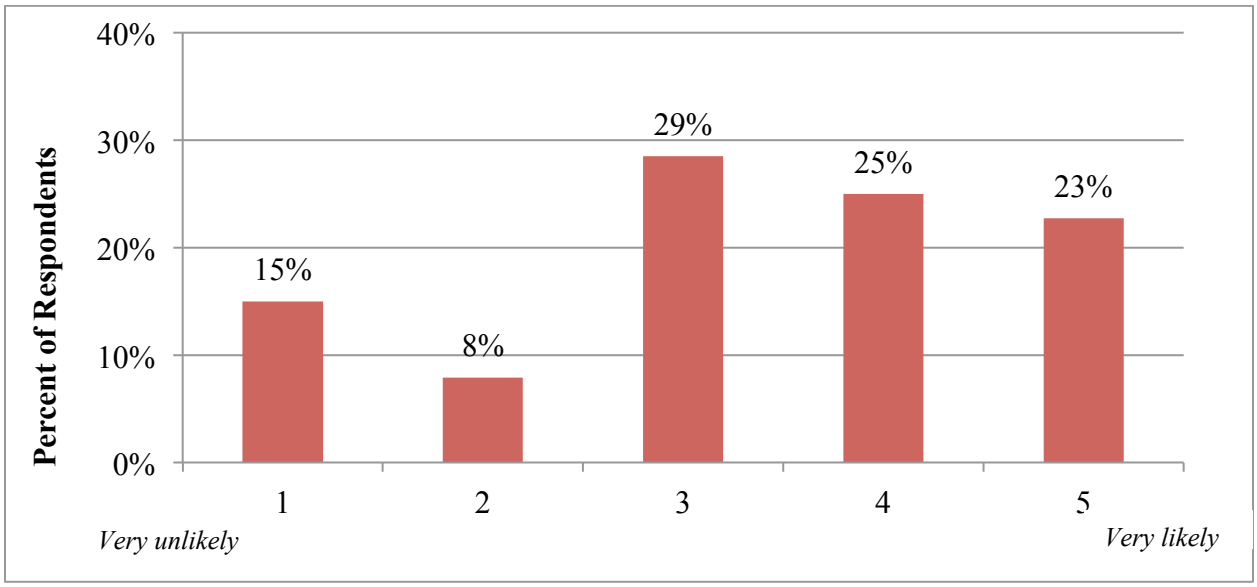


Figure 11. Likelihood of respondents to cut trees as a habitat management practice



Incentives to Cut Trees as a Habitat Management Practice

We identified two categories of incentives (education and outreach incentives and financial incentives) that explain what might encourage landowners to cut trees to create habitat for NEC. The most powerful incentive to encourage this management practice is paying the respondent $1,000/acre (29% definitely would be encouraged, Table 6).

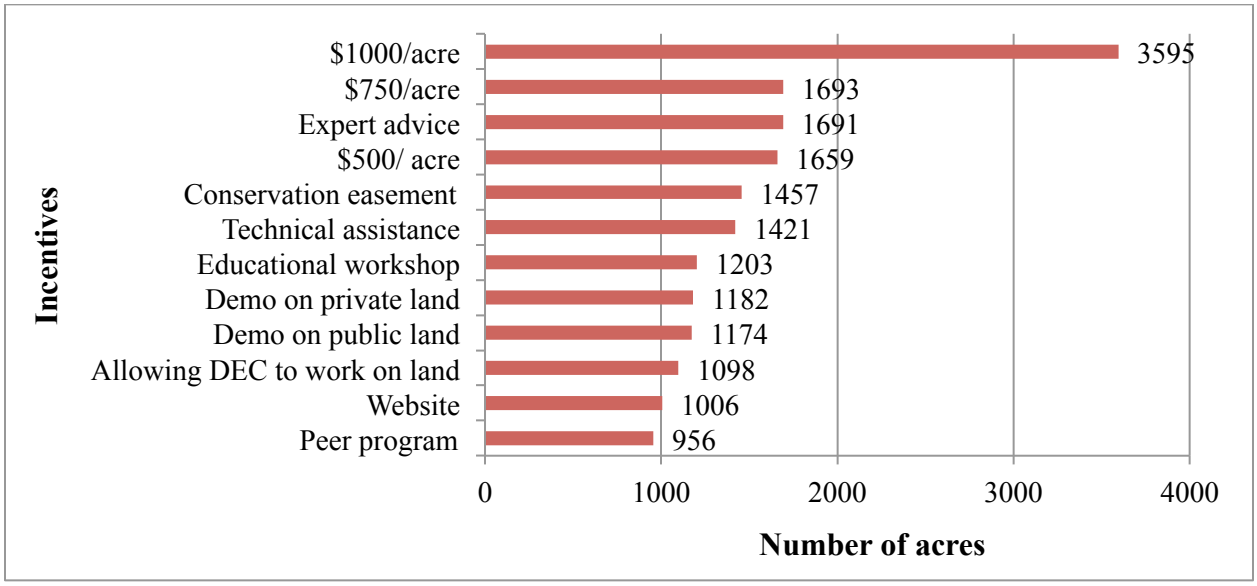
Table 6. Likelihood of incentives to encourage respondents to cut trees as a habitat management practice

Incentives	**% of respondents who indicated "definitely would encourage*"**
Education and outreach incentives	
Expert advice from a wildlife biologist or other professional	20%
Allowing DEC or partners to perform work on your land at no cost to you	16%
Technical assistance in writing a wildlife management plan	16%
Educational workshop about cutting trees	13%
A demonstration area showing the practice on public land	13%
A demonstration area showing the practice on private land	12%
NewEnglandcottontail.org website or other online resources	12%
A peer program where you would learn from other landowners	10%
Financial incentives	
Financial incentive that pays landowner about $1000/acre	29%
Conservation easement	13%
Financial incentive that pays landowner about $750/acre	11%
Financial incentive that pays landowner about $500/acre	10%

*Encouragement was measured on a 5-point scale where 1 = makes no difference to 5 = definitely would encourage

This 29% owns a total of 3595 acres of woodland (Figure 12). Expert advice from a wildlife professional definitely would encourage 20% of respondents (Table 6), that own a total of 1691 woodland acres (Figure 12). Allowing DEC to perform work on the land at no cost and technical assistance in writing a management plan definitely would encourage 16% of respondents to cut trees, (Table 6), although those respondents own fewer acres of woodland (Figure 12). Conversely, a financial incentive of $750/acre definitely would encourage only 11% of respondents to cut trees, but those respondents own the second highest number of wooded acres (1693 [Figure 12]).

Figure 12. Total number of wooded acres owned by respondents that definitely would be encouraged by incentives to cut trees. Acreages are not mutually exclusive; respondents may have indicated that more than one incentive definitely would encourage the management practice.



Barriers to Managing Private Land for New England Cottontail

Overall, the largest barriers to respondents managing for NEC on their land are the difficulty in controlling invasive species, not knowing what to do for management, and the rare status of NEC (Table 7). The abundance of Eastern cottontail, a lack of interest in rabbits, and a lack of interest in habitat management are not strong barriers for respondents to manage for NEC (Table 7). However, no one barrier stood out as being particularly important; the neutral category was most frequently selected for most categories. There are several possible reasons for this; respondents may have no idea what is required for this type of management, have not considered it prior to this survey, or may be learning about it for the first time while responding to the questionnaire.

Table 7. Barriers to habitat management for New England cottontail

Barrier	Percent of Respondents		
	Strongly disagree or Disagree	**Neutral**	**Strongly agree or Agree**
Difficulty in controlling invasive species	14%	43%	43%
Don't know what to do	15%	48%	38%
Rare status of New England cottontail	20%	50%	30%
Potential listing of New England cottontail on the Endangered Species List	26%	48%	26%
Too expensive	23%	57%	20%
Not interested in rabbits generally	48%	35%	17%
Abundance of Eastern cottontail	27%	56%	17%
Not interested in wildlife habitat management	65%	24%	12%

Sources of Information and Support Regarding Land Management

Respondents are most likely to be using conservation organizations and NYSDEC sources of support and information to inform decisions about habitat management (Table 8). Accordingly, respondents are most likely to use conservation organizations and NYSDEC for information and land management support in the future.

Table 8. Use and interest in education and informational support

Information Source	Currently use?	Likely to use in the future?
	% Checked Yes	
Conservation organization	23%	63%
New York State DEC	20%	53%
Government agency (not DEC)	10%	35%
Private consultant	10%	25%

Regional Variation among Responses

We used an ANOVA test to compare the effect of regional variation (by county) on every variable in the survey. We combined Westchester and Putnam Counties for the analysis because of their similarities in development patterns within the study area. We performed Tukey HSD post hoc comparisons on all variables with significant differences ($p \leq 0.05$ unless otherwise indicated). The variables on which region had no significant effect are not reported on here. The results suggest that the county in which a respondent lives does have a significant effect on behavior, attitude, and effectiveness of incentives for land management in the Hudson Valley (Tables 9a and 9b). Specifically, respondents in Westchester and Putnam Counties are less likely own land for hunting and fishing or passing on to heirs. They are less concerned about the woodland benefits achieved by harvesting trees and are less concerned with norms, such as whether their friends, family, or other respondents are concerned with managing for NEC (Table

9a). In addition, financial incentives are less likely to encourage habitat management in Westchester and Putnam Counties than the other counties (Table 9b).

Table 9a. Survey variables with statistically significant regional differences

	N	Mean	Std. Deviation	F	Sig.
Reasons for owning woodland					
To pass on to heirs				3.643	.027
Columbia[a]	81	3.74	.919		
Westchester & Putnam[b]	35	3.11	1.471		
Dutchess[ab]	211	3.51	1.177		
For hunting or fishing				3.387	.035
Columbia[a]	82	3.26	1.464		
Westchester & Putnam[b]	35	2.51	1.337		
Dutchess[ab]	214	3.09	1.424		
Attitudes towards harvesting trees					
Harvesting trees is sometimes necessary for the eco. health of woodlands				3.146	.044
Columbia[ab]	83	4.11	.681		
Westchester & Putnam*[a]	34	3.94	1.127		
Dutchess*[b]	218	4.27	.764		
Harvesting trees from a woodland can improve habitat for wildlife				6.312	.002
Columbia[a]	82	3.89	.770		
Westchester & Putnam[b]	33	3.27	1.008		
Dutchess[a]	213	3.76	.854		
Harvesting trees can sometimes be good for a woodland				7.822	.000
Columbia[a]	82	3.95	.718		
Westchester & Putnam[a]	34	3.74	.898		
Dutchess[b]	215	4.17	.621		
Norms					
Managing for NEC habitat is important to my friends				3.408	.034
Columbia[a]	85	3.46	.795		
Westchester & Putnam[b]	38	3.03	1.052		
Dutchess[a]	227	3.39	.872		
Managing for NEC habitat is important to other landowners				4.576	.011
Columbia[a]	85	3.34	.646		
Westchester & Putnam[b]	38	2.92	.941		
Dutchess[a]	226	3.31	.772		
Managing for NEC habitat is important to forest and wildlife professionals				5.093	.007
Columbia[ab]	85	3.91	.840		
Westchester & Putnam[a]	38	3.55	.950		
Dutchess[b]	228	4.00	.777		

[abc] – localities followed by thdifferent (Tukeys test $p<0.05$ unless othe

*Tukeys test significance at $p<0.07$

Table 9b. Incentives with statistically significant regional differences

	N	Mean	Std. Deviation	F	Sig.
Incentives to allow old fields to grow into forest					
Financial incentive that pays landowner about $75/acre				3.364	.036
Columbia[a]	82	2.72	1.317		
Westchester & Putnam[b]	34	2.09	1.215		
Dutchess[ab]	216	2.39	1.289		
Financial incentive that pays landowner about $100/acre				3.521	.031
Columbia[a]	83	3.05	1.431		
Westchester & Putnam[b]	36	2.36	1.397		
Dutchess[ab]	221	2.67	1.412		
Incentives to cut trees					
Financial incentive that pays landowner about $1,000/acre				3.625	.028
Columbia[a]	79	3.70	1.264		
Westchester & Putnam[b]	32	2.94	1.544		
Dutchess[ab]	212	3.32	1.483		

[abc] – localities followed by the same letter are not significantly different (Tukeys test $p<0.05$ unless otherwise indicated)

CONCLUSIONS

The conclusions in this section are specific to New England cottontail habitat management on private land. This study covers the New England cottontail focus area in Westchester, Putnam, Dutchess, and Columbia Counties, NYS and do not necessarily apply to other regions.

- The majority of respondents feel that it is the responsibility of people who own wooded land in Westchester, Putnam, Dutchess, and Columbia Counties, NYS to take care of it for future generations. Furthermore, 25% of respondents own their woodlands to pass on to heirs. These results indicate that some respondents in the study area may be open to long-term management options that allow their property to retain aesthetic and/or monetary value.

- Nature and aesthetic values are very important reasons why respondents own woodland in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. Utilitarian reasons, such as production of timber and farming, are less important reasons for owning woodland. Furthermore, respondents view woodland benefits[3] as a more important reason to harvest trees than economic benefits[4]. These results highlight the need to emphasize ecological, conservation, and aesthetic values when communicating to landowners about management options, rather than utilitarian uses and/or economic benefits.

[3] Woodland benefits includes: harvesting trees is sometimes necessary for the ecological health of woodlands; harvesting trees can sometimes be good for a woodland; it is okay to harvest trees from private woodlands; when necessary, trees should be harvested from woodlands to prevent forest fires; harvesting trees from a woodland can improve habitat for wildlife; woodlands should be left untouched by humans

[4] Economic benefits includes: harvested trees should be used to produce products that humans can use; harvesting trees is sometimes necessary to provide economic profit to woodland owners; harvesting trees is good for the economy

- Respondents in Westchester, Putnam, Dutchess, and Columbia Counties, NYS feel that professional biologists consider management of New England cottontail to be important. Furthermore, NYSDEC is an important source of information and habitat management support for respondents. These results emphasize the role that wildlife professionals, such as those in NYSDEC, can play in supporting and influencing landowner decision-making as it pertains to NEC habitat management.

- It is very important to respondents in Westchester, Putnam, Dutchess, and Columbia Counties, NYS that they retain power over the decisions made about their land. Program individualization, flexibility, goals, and enrollment simplicity are very important characteristics of an incentive program targeted at specific habitat management actions.

- Grassland-owning respondents in Westchester, Putnam, Dutchess, and Columbia Counties, NYS hold slightly positive attitudes about growing old fields into forest as a habitat management practice. However, only 26% of respondents have done this management practice in the past and overall, respondents are unlikely to use it in the future. More research is needed to determine why this apparent discrepancy in attitude and behavioral intent exists.

- As a group, education and outreach incentives definitely would encourage more grassland-owning respondents in Westchester, Putnam, Dutchess, and Columbia Counties, NYS than financial incentives to allow old fields to grow into forest. Specifically, the highest percent of respondents indicated that DEC working on their land (21%, owning 987 acres) and expert advice (19%, owning 954 acres) definitely would encourage them. While this result demonstrates the important role of wildlife professionals in educating and encouraging respondents, financial incentives may have an equally important role. While only 10% of respondents indicated that a rental rate definitely would encourage them to allow old fields to grow into forest, that 10% owned the most acres of grassland (1019 acres). Therefore, in terms of impact of the incentive, the rental rate for grassland landowners could be significant.

- The most powerful single incentive to encourage respondents to cut trees as a habitat management practice in Westchester, Putnam, Dutchess, and Columbia Counties, NYS is paying the respondent $1,000/acre (29%, definitely would be encouraged, owning a total of 3595 acres of woodland). However, as a group, education and outreach incentives definitely would encourage more woodland-owning respondents to cut trees than would financial incentives. The most powerful educational incentives are: expert advice from a wildlife professional (20%, 1691 acres) and assistance with writing a management plan (16%, 1421 acres).

- There are regional variations in behavior, attitudes, and the likelihood of incentives to encourage habitat management for New England cottontail in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. Respondents in Westchester and Putnam Counties are less likely to own land for hunting and fishing, feel less strongly about woodland benefits for harvesting trees, are less concerned with norms, and are not as motivated by financial incentives as respondents from the other Counties in the study.

- No singular barrier stood out as a reason that prevents respondents from managing for New England cottontail habitat on their land in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. For nearly every barrier listed in the survey, the majority of responses were in the "neutral" range. This result could be because respondents have not undertaken management for New England cottontail in the past and do not have strong attitudes about what is preventing them from undertaking a behavior they have not thought much about.

RECOMMENDATIONS FOR NATURAL RESOURCE PROFESSIONALS

The recommendations in this section are specific to New England cottontail habitat management on private land. Similar to the conclusions discussed above, recommendations are intended for the New England cottontail focus area in Westchester, Putnam, Dutchess, and Columbia Counties, NYS and do not necessarily apply to other regions.

1. Emphasize the ecological, conservation, and aesthetic values of habitat management when communicating to landowners in Westchester, Putnam, Dutchess, and Columbia Counties, NYS about land management options, rather than utilitaritian and/or economic benefits.

2. A successful habitat management incentive program should appeal to the specific motivations of private landowners in in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. As indicated in recommendation #1, the incentive program should appeal to the aesthetic and conservation values of land management and emphasize the long-term benefits of managing for New England cottontail. Based on an understanding of landowners' wants and needs, agency personnel can work together and with conservation organizations to help ensure that an incentive program addresses those wants and needs. Such an understanding will also improve landowners' decision-making power about their lands.

3. Education and outreach incentive packages offered in Westchester, Putnam, Dutchess, and Columbia Counties, NYS could be very effective for encouraging landowners both to allow old fields to grow into forest and to cut trees as habitat management practices. Wildlife professionals, such as those in NYSDEC, play an important role in supporting and influencing landowner decision-making in Westchester, Putnam, Dutchess, and Columbia Counties, NYS. NYSDEC should partner with conservation organizations (such as those listed in Figure 4) in communication and educational support to encourage landowners to manage their land for New England cottontail.

4. Financial incentive packages offered in Westchester, Putnam, Dutchess, and Columbia Counties, NYS should be offered at the highest amount possible for greatest success. Financial incentive packages for cutting trees as a habitat management practice are more likely to be successful if they are targeted at Columbia and Dutchess Counties.

5. Allow landowners in Westchester, Putnam, Dutchess, and Columbia Counties, NYS to retain decision-making power and flexibility over their land management decisions as a part of any incentive program that is offered to them. Resource professionals interviewed before the survey suggested reducing bureaucracy and "red tape" involved with landowner participation in programs.

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APPENDIX A

EXPERT INTERVIEW INSTRUMENT

1. Tell me about your work with private landowners and habitat management. (the nature of your position, the kinds of landowners you work with, and the kind of habitats)

2. What specific management actions do you recommend landowners undertake for New England Cottontail habitat?

3. What experience do you have requesting permission from private landowners to access their property to conduct biological surveys?

4. What experience do you have with landowner incentive programs? (what has been your role, what kinds of programs, what kinds of landowners/habitats?)

5. In your experience, what has worked in reaching out to landowners to participate in habitat management for New England Cottontail? If no experience with New England Cottontail, what about wildlife management more broadly?

6. What types of landowners have you had success with getting enrolled? What kinds of incentives? What kinds of approaches? What kinds of habitat?

7. What hasn't worked? What kinds of incentives? What kinds of approaches? What kinds of habitat?

8. What types of landowners have you not succeeded in getting enrolled in habitat management programs, or New England Cottontail specifically?

9. When asking for permission, are there any common reasons provided for denying permission?

10. In your opinion, what are some of the barriers to landowner participation in habitat management on their lands?

    In general?

    For New England Cottontail specifically?

    What is the best way to overcome these barriers?

11. What feedback, positive or negative, have you gotten from landowners who are participating in existing incentive programs?

12. Anything else to add?

EXPERT INTERVIEW RESULTS

Enrollee motivations for managing for New England cottontail habitat

All of the interviewees perceive that the landowners that have enrolled in NEC habitat management programs, or that have expressed interest in enrollment, are motivated by a combination of wildlife, nature, or wildlife recreation. The most common motivation cited for creating NEC habitat was to improve hunting on one's land (4 out of 13 interviewees). One federal wildlife biologist stated:

> *And so his thinking was, "If it's good rabbit habitat, then maybe more deer could come in." And that intrigued him about the program.*

State wildlife biologists reported similar perceptions.

Wildlife viewing (n = 3) and a general affinity for "nature" (n = 2) were also cited as perceived motivations for landowners enrolling in programs. Experts sense that those landowners who have enrolled are interested in bird watching or just generally like to see animals on their property. An appreciation for nature is a similar motivation for program enrollment. One state wildlife technician observed:

> *If a person is interested in nature, not interested in developing, that seems to be one of the other major turning points for work with these programs.*

The other enrollee motivations discussed by interviewees included desire for a clear view (n = 2) and a desire to manage land responsibly (n = 2). Professionals reported that they believe some landowners are motivated to manage for ESH to benefit NEC because it will open up their viewshed, and improve their wildlife viewing experiences. Other experts perceive that some landowners just want to be responsible in the way they manage their forestland, and so they are excited about possibility of receiving funds or technical assistance to help them do so.

While none of the interviewees perceive that the very few landowners who have enrolled in NEC habitat management programs have done so specifically for the benefit of the individual species, they do all agree that successful enrollment has been largely due to wildlife recreation opportunities and a general appreciation for nature. These results are similar to those from Dayer *et al*.'s (2011) findings about landowner ownership motivations in the Southern Tier of New York. In that research, interviews with forestry experts and responses from a landowner survey suggested that landowners are highly motivated to own and manage their forests for nature, wildlife, and wildlife recreation.

Hunting, wildlife viewing, nature, and desire for a clear view or responsible management are all motivations that experts recognize to have driven landowners to enroll in programs to manage forestland for NEC habitat. However, the number of enrollees in these programs is very low, so it is important to also gain an understanding of what experts perceive to be major barriers to enrollment.

Barriers to managing for New England cottontail habitat

Interviewees reported many perceived barriers to enrolling landowners in habitat management programs to benefit NEC (*See* Table 1). Barriers discussed included both those issues that pose barriers for landowners and those that impede professionals. There is little agreement as to which perceived barriers are most prevalent, with only 3 to 4 interviewees discussing any given barrier. However, the total number of times each barrier was discussed highlights those barriers that may be most important (*See* Table 1).

Table 1. Barriers to ESH management for New England cottontail perceived by interviewees

Barriers	Interviewees that discussed the issue (n)	Total mentions of the issue (n)	Example quotation
Bureaucratic*	4	12	"People get discouraged when they sign up for programs and the format of the form is complicated, the process is complicated, and it takes a long time, if they don't get any feedback. Then people don't sign up again. They say: "That takes too much time and hassle." We've had that feedback, where it took too long, was too complex and there were too many hoops to jump through." (*State Wildlife Biologist)*
Region	4	9	"Our payment rates are not competitive for this area." (*State Forester)*
Cost	4	9	"The cost of doing business in this area is one of the biggest barriers. The cost of land ownership in the part of the state is quite high, and definitely plays a big role in whether people are willing to become involved in incentive programs." (*State Forester)*
Maintenance	3	7	"It seems really daunting to them because they're mostly second home owners and they're not here all the time. So I think they're worried that they're setting themselves up to fail. Because it's a lot for landowners to undertake." (*Federal Wildlife Biologist)*
Resistance to cutting	3	6	"There hasn't been a lot of outreach about the value of early successional forest so there's this perception that cutting trees is bad, number one." (*State forester)*
Landowner development plans*	3	5	"In this area there are other financial incentives [to consider]. It's things like selling their land for development." We're seen a peak in development pressure in this region." (*State Wildlife Biologist)*
No access to equipment	3	4	"Certainly in this region it's much more difficult to find operators and to find equipment than in other areas of the state where agricultural uses are more prevalent." (*State Wildlife Biologist)*

Difficulty in contacting landowners*	3	4	"Actually I think the biggest barrier is finding people's contact information, getting in touch with them. A lot of the time we have trouble with the tax per square being out of date or not being able to find the phone number." (*State Wildlife Technician)*
Fear/avoidance of endangered/threatened species**	3	3	"There are some who would be excited, "I have this rare rabbit on my property, Cool!" Then there's the other school of thought that says "I don't want to know if I have that on my property because then the government is going to tell me that I can't do stuff." (*NGO Wildlife Biologist)*
Invasive species**	3	3	"I know a property owner who said that you they had spent a lot of time clearing out invasives like Multiflora rose, and were concerned because they had sort of gotten their property to where they wanted it. There are some issues that once you remove something what you're going to get in return. So invasive species often become a problem." *(Federal Wildlife Biologist)*

* Barrier for both landowners and professionals
** Divergent perspectives from interviewees

Bureaucratic Barriers

Bureaucratic barriers were discussed far more than any other barrier (n = 12) and were reported both as a barrier for landowners enrolling in programs and for professionals in administering programs. The term "bureaucratic" was used broadly by a number of interviewees to refer to a variety of issues related to getting landowners to enroll. Perceived barriers for landowners ranged from the amount of paperwork involved, to the lag times experienced when applying for programs, to confusion surrounding the enrollment process, to lack of information about programs, to aversion to working with federal or state agencies. One state wildlife technician stated succinctly:

> *I know the paperwork side of things seems to get in the way a lot. So a lot of paperwork, or lag times, that can be confusing falling on the landowner and can be a detriment to them following up or going through the process.*

The interviewees perceive that landowners may also be unaware that programs exist to help in forestland management for wildlife habitat, or may be misinformed as to the process (e.g., which land has priority in receiving funding, how that is determined, and why that system exists). Some interviewees reported that landowners have expressed frustration in completing the forms for enrollment, only to be turned down for funding because their land was not ranked high enough on the list. Others suggested that the deadlines for program funding may confuse landowners, as the deadlines for application are not hard and fast, but this is not made clear to landowners.

Bureaucratic barriers also pose problems for professionals in administering programs. Interviewees reported that difficulty in determining which lands enrolled in programs require permitting for wetlands is particularly problematic. NEC prefer habitat in damp areas, and as such, the rabbit's range can potentially overlap wetlands. In order to manipulate lands that could impact wetlands, a complex process of permitting from both state and federal agencies is required. One state wildlife technician expressed this bureaucratic barrier in their interview:

> *The other issue is potentially permitting issues for impact to wetlands and adjacent areas from these activities, and clarifying what would need a permit from what doesn't.*

Another bureaucratic barrier for professionals that interviewees discussed was the difficulty in contacting landowners about programs (n = 3). Professionals either could not obtain landowner contact information, or were unable to reach target landowners with announcements about programs.

Region as a barrier

Interviewees identified region as a barrier for landowners because of the cost of land management in the area. There was concern expressed among interviewees that the high price of hiring contractors in the Hudson Valley deters landowners from participating in

programs because they will be unable to complete the work required with the funds they are given. A state forester asserted that the current rates being offered landowners to manage for NEC "are not competitive for the area."

In regards to equipment access, one interviewee observed that in other parts of the state where a landowner wants to perform forestland management, frequently they are able to borrow the necessary equipment from neighboring landowners. However, because of the markedly fewer agricultural lands in the Eastern Hudson Valley, this is not usually the case in the region. Therefore, landowners interested in managing their forestland for wildlife habitat would likely have to hire a contractor, thus compounding the issue of the cost of doing business in the region.

Interviewees also perceive regional barriers to enrolling landowners in programs for ESH management to benefit NEC due to the lower instances of hunting. Interviewees suggested that hunters have a greater appreciation and understanding for the importance of actively managing forestland (n = 2) and so fewer hunters in the region makes enrolling landowners in management programs that much more difficult. A state forester said:

> *In this area hunting isn't as popular. I'd say the biggest success we have is with hunters because they understand the need for it…. I think we just don't have as much hunting down here in the Lower Hudson Valley so they might not be as aware.*

Resistance to cutting

Landowners' resistance to cutting trees was also identified as a barrier to forest landowners enrolling in programs to manage their land for NEC habitat (n = 3, total mentions n = 6). Through their interaction with landowners and their general understanding of landowner preferences for forestland manipulation, interviewees perceive that landowners are incredibly averse to cutting in any regard. A state forester discussed how even landowners who are interested in managing for the NEC were turned off by the prospect of cutting trees:

> *I've talked to a couple groups that are very environmentally focused about managing for New England cottontail and they're like "Yea, that's great! . . . What does it involve?" And I say "Alright, well, cutting these trees." And they say "Oh, no. We can't cut trees. No, no."*

Professionals, however, identify cutting trees as the most favored practice for creating the type of habitat that NEC require, which suggests that there is a disconnect between landowner attitudes about cutting trees and its utility as a habitat manipulation to create ESH to benefit NEC. Strategies for overcoming this disconnect, as well as for overcoming other barriers identified by professionals, are essential to creating a successful incentive program.

Other barriers

Several other barriers were discussed fewer times than those previously mentioned, but deserve consideration because of the diverse perspectives of interviewees. One such barrier was the presence endangered or threatened species on one's private property. One federal wildlife biologist suggested that even the possibility of having a threatened species on one's land could greatly inhibit participation in a program to benefit that species, due to the potential for increased regulatory burden if the species should become endangered. This interviewee saw the presence of a threatened or endangered species as detrimental to enrollment in a habitat management program. One wildlife technician, however, suggested that the presence of such a species could excite landowners and motivate them to act. That interviewee indicated that appealing to a landowner's interest in or affinity for nature or wildlife could improve the likelihood of enrollment. This assertion suggests that an understanding of landowner characteristics and motivations for managing private forest for wildlife habitat would be particularly useful when an endangered or threatened species is involved, and may improve the chances of enrolling landowners in an incentive program.

The presence of invasive plant species, such as Multiflora rose, was identified as a barrier to enrollment by one wildlife biologist, but as an opportunity for creating habitat by another wildlife biologist. One interviewee discussed the presence of this species as a deterrent to program enrollment because some species can be very difficult to control and the requirements to remove these plants may be too burdensome for the landowner to be interested in enrolling in a program. Another interviewee, however, mentioned that a number of these invasive plant species actually create good habitat for early successional-dependent species, such as the NEC, and if a land management program were to embrace the presence of such plant species, landowners may be less discouraged to undertake management on their land to create wildlife habitat. Several interviewees mentioned that landowners have specifically expressed concern over eliminating invasive plants from their land, so landowner preferences and attitudes would likely need to be considered to determine whether allowing invasive species to remain would actually improve likelihood of enrollment.

Overcoming barriers to managing for New England cottontail habitat

To identify strategies for dealing with barriers to managing private land for NEC habitat, interviewees were asked what they believe would work best to overcome barriers. Strategies for overcoming barriers were far less widespread than the suite of barriers that interviewees discussed. While education was the most frequently identified tool for overcoming barriers, there were several other strategies raised that are worth noting (*see* Table 2). Use of a cost-share was discussed by only 3 interviewees (total mentions = 7). Although it was not mentioned as frequently as education, when cost-share was mentioned, it was asserted by interviewees as an absolute necessity to an effective program, suggesting the importance of providing some sort of financial incentive. One NGO wildlife technician said:

> *Financial incentives are always better. The money is always better. That's just the way it is. Always better. And it doesn't matter who it is. If you can say, "We'll pay you to do that" they're all over it.*

The strategy for overcoming barriers that was discussed least frequently was that of simplifying the process of enrollment for landowners, which was discussed by 2 interviewees for a total of 2 mentions. Providing equipment and/or technical support to landowners were other strategies identified for overcoming barriers (n = 2; total mentions = 4).

Table 2. Strategies for overcoming barriers to early successional habitat management for New England cottontail (as perceived by interviewees)

Strategy for overcoming barriers	**Interviewees that discussed the issue (n)**	**Total mentions of the issue (n)**	**Example quotation**
Education	5	15	"When I meet with landowners I always print out a map of what their land looked like in 1940, and 80% of the time it's open fields, which just goes to show them how the landscape has changed, and that we're really losing habitat. It's just going to take education." (*State Forester)*
Cost-share	3	7	"There are people that wouldn't be opposed to managing, but if there's another use of that land that's going to provide financial benefits, that's going to factor into their decision. So we've got to be able to offer a financial incentive. That seems to make the most sense to them." (*State Wildlife Biologist)*
Providing equipment and/or technical support	2	4	"What I found is they really just want technical advice, and to know that what they're thinking of doing is the right thing to do, and then how to go about it. They love technical support." (*NGO Wildlife Technician)*
Simplifying process	2	2	"The process needs to be simple. The process needs to not be complicated. It needs to not take a long time and once you find out, you need to have an answer back pretty quickly." (*NGO Wildlife Biologist)*

Education of landowners

Education of landowners was the most heavily emphasized strategy for overcoming barriers to enrolling landowners in private land management programs for wildlife habitat. Education was discussed by 5 interviewees for a total of 15 mentions. The category "education" encompasses many different forms of information communication identified by interviewees: landowner workshops, literature (websites and informational brochures/mailings), and one-on-one communication. Interviewees suggested the need for education about several different issues, such as the existence of programs, the need for creating wildlife habitat, the importance of managing private land, and program enrollment processes. As one NGO wildlife biologist put it:

> *Education is the way to go. Education is huge. It's always amazing when you're showing somebody something and you can see the light bulbs go off in their head…. Once you explain the reason behind it you usually get a lot more buy-in from folks.*

Education was discussed as a strategy for overcoming the specific barrier of resistance to cutting. Some interviewees believe that educating landowners on the importance of actively managing forestland will help combat some of the opposition they faced from landowners who are unwilling to cut trees. Educating landowners about the benefits of land management for specific species was also mentioned as a strategy by several interviewees. Other interviewees also discussed the need for education of landowners to overcome initial prejudice about managing for wildlife habitat and young forest.

Similar results were found in Dayer *et al*.'s (2011) survey in the Southern Tier of New York. Forestry professionals in that survey identified education as one of the most important components to encouraging private landowners to manage their lands for ESH.

Reaching landowners

The perceived importance of education of as a strategy for overcoming barriers requires that professionals be able to engage with landowners; yet one of the bureaucratic barriers identified by interviewees was difficulty in contacting landowners. Interviewees were asked about strategies for reaching landowners in regards to which approaches have been successful and which approaches would be most effective.

Strategic targeting

Several strategies were identified for contacting landowners, with little variation in the total number of interviewees discussing each strategy. The most frequently mentioned approach was strategic targeting of landowners (n = 5; total mentions = 14). Strategic targeting refers to professionals reaching out to a particular landowner based on knowledge of that landowner's land characteristics and/or land ownership motivations. One state forester stated:

> *I think aligning with the landowner's goals is . . . when programs align with the landowner's goals then that's when they do the project. . . and for our outreach efforts*

> *we're targeting people, landowners who are adjacent to known New England cottontail sites, and we've had success with that.*

Interviewees suggested that targeting works because it either effectively engages a landowner's ownership goals (such as hunting or wildlife viewing), encourages enrollment in programs because of the understanding of the direct effects management on their land could have, or because of the understanding that funding could be available for such management. To target landowners strategically, professionals must: 1) know where NEC are located, and 2) know what ownership motivations are for landowners in those areas. Both NEC range and an understanding of landowner motivations can be ascertained through referrals, which is another strategy that professionals identified for reaching landowners.

Referrals

Referrals occur between agencies, typically when an interested landowner contacts an agency that does not have a program available to meet the landowner's needs but another agency does, or when an agency understands the characteristics of an individual landowner they have already worked with and want to alert another agency of the potential for enrolling that landowner. Referrals were only mentioned by 3 interviewees (total of 6 mentions) but all of these interviewees reported that referrals were a strategy they had used successfully for reaching landowners, or helping other agencies reach landowners. A state wildlife biologist said:

> *I get a list of people in that area that we have these long-term relationships with, that ask about programs, and we pass those along to NRCS, and have had people say yes.*

The relationship between referrals and strategic targeting suggests opportunities for agency coordination in reaching landowners. Agencies can help one another identify potentially interested landowners through referrals, which can alleviate the difficulty in contacting landowners for professionals.

Other strategies for reaching landowners

Using one-on-one communication is another tactic that interviewees have had success with when reaching out to landowners regarding managing private lands for wildlife habitat (n = 5; total mentions = 9). One-on-one communication involves strategies such as meeting personally with landowners or engaging with landowners over email or phone. Public outreach and strategic messaging were other strategies interviewees discussed for reaching landowners. Strategic messaging refers to tailoring messaging or information dissemination to the particular group of landowners based on an understanding of their group characteristics, such as targeting hunters by appealing to their hunting motivations, or by distributing materials to hunting organizations.

APPENDIX B

NEW ENGLAND COTTONTAIL SURVEY

SURVEY OF LANDOWNERS IN THE EASTERN HUDSON VALLEY

WITH RESULTS

New York State Department of Environmental Conservation

Cornell University
Human Dimensions Research Unit

Mail survey of 1,200 landowners in the Eastern Hudson Valley (n= 367, 33.9% response rate [121 undeliverable; 17 refused]). Survey conducted in October and November 2013. Please contact Dr. Shorna Allred with questions, srb237@cornell.edu (607) 255-2149.

NEW YORK NEW ENGLAND COTTONTAIL SURVEY

Research conducted by the

Human Dimensions Research Unit

Department of Natural Resources

Cornell University

in cooperation with the

New York State Dept. of Environmental Conservation (DEC)

The purpose of this survey is to learn about your experience with wildlife habitat management on your private land, and your opinions about New England cottontail. Cornell University is conducting this survey to provide the DEC Bureau of Wildlife with important information on the views of private forest landowners in the Hudson Valley region of New York. The Bureau of Wildlife will use this information to guide decisions about future incentive programs for creating New England cottontail habitat.

The New England cottontail lives in parts of New England and New York State. The population of this once-common rabbit has declined considerably over the last 50 years. The most critical threat to the cottontail is a loss of habitat -- the places where rabbits can find food, rear young, and escape predators. Changes in land use have taken much of the land once inhabited by cottontails and other wildlife. And thousands of acres that used to be young forest (ideal rabbit habitat) have grown up into middle-aged and older woods, where cottontails don't generally live. Loss of habitat and competition from the introduced and abundant Eastern cottontail have caused the New England cottontail to be considered for listing on the federal Endangered Species List.

Please complete this questionnaire as soon as you can, seal it with the white re-sealable label provided, and drop it in any mailbox; return postage has been paid. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. Your identity will be kept confidential and the information you give us will never be associated with your name.

THANK YOU FOR YOUR HELP!

RESULTS

ATTITUDES AND MOTIVATIONS

1. The responsibility of people who own woodland is to take care of it for future generations. *n=360* (frequencies and percentages below)

STRONGLY DISAGREE	1 *n=10 (2.8%)*	2 *n=7 (1.9%)*	3 *n=34 (9.4%)*	4 *n=64 (17.8%)*	5 *n=245 (68.1%)*	STRONGLY AGREE

2. How positive or negative do you feel about managing your woodlands for New England cottontail? (please see introduction for background information on New England cottontail). *n=346* (frequencies and percentages below)

VERY NEGATIVE	1 *n=4 (1.2%)*	2 *n=16 (4.6%)*	3 *n=114 (32.9%)*	4 *n=92 (26.6%)*	5 *n=120 (34.7%)*	VERY POSITIVE

3. Do you see any rabbits on your property? *n=357* (frequencies and percentages below)

☐ Yes *n=269 (75.4%)* ☐ No *n=88 (24.6%)*

4. Over the past 5 years, do you feel that the number of rabbits on your property has: *n=358* (frequencies and percentages below)

☐ Greatly decreased *64 (17.9%)*

☐ Slightly decreased *63 (17.6%)*

☐ Stayed about the same *100 (27.9%)*

☐ Slightly increased *52 (14.5%)*

☐ Greatly increased *16 (4.4%)*

☐ Don't know *63 (17.2%)*

5. People own woodland for many reasons. Please indicate how much you agree or disagree with each of the following reasons for why you own your woodland. (frequencies and percentages below)

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
a. To enjoy the scenery *n=333*	3 0.9%	1 0.3%	20 6.0%	124 37.2%	185 55.6%
b. To protect nature *n=334*	4 1.2%	6 1.8%	37 11.1%	145 43.4%	142 42.5%
c. To provide a place for wildlife to live *n=331*	5 1.5%	8 2.4%	36 10.9%	145 43.8%	137 41.4%

d. For land investment (i.e. to sell in the future) *n=334*	29 8.7%	47 14.1%	111 33.2%	97 29.0%	50 15.0%
e. For privacy *n=334*	3 0.9%	7 2.1%	30 9.0%	117 31.9%	177 53.0%
f. To pass land on to my heirs *n=328*	21 6.4%	35 10.7%	105 32.0%	85 25.9%	82 25.0%
g. For production of timber products for sale *n=333*	90 27.0%	93 27.9%	105 31.5%	35 9.5%	10 3.0%
h. For production of timber products for my family's use *n=334*	64 19.2%	72 21.6%	91 27.2%	71 21.3%	36 10.8%
i. For non-timber forest products (e.g. Maple syrup) *n=332*	72 21.7%	77 23.2%	128 38.6%	39 11.7%	16 4.8%
j. For farming *n=331*	50 15.1%	61 18.4%	104 31.4%	77 23.3%	39 11.8%
k. For hunting or fishing *n=332*	72 21.7%	47 14.2%	66 19.9%	80 24.1%	67 20.2%
l. For birding or bird watching *n=334*	19 5.7%	16 4.8%	82 24.6%	127 38.0%	90 26.9%
m. For recreation that isn't wildlife related *n=333*	25 7.5%	29 8.7%	76 22.8%	119 35.7%	84 25.2%
n. Other (please specify) *n=32* _____	2 6.3%	0 0.0%	5 15.6%	5 15.6%	20 62.5%

6. Please indicate the extent to which you agree or disagree with each of the following statements about harvesting (cutting) trees. (frequencies and percentages below)

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
a. Harvesting trees is sometimes necessary for the ecological health of woodlands. *n=336*	4 1.2%	7 2.1%	34 10.1%	165 49.1%	126 37.5%
b. It is okay to harvest trees from private woodlands. *n=332*	11 3.3%	22 6.6%	66 19.9%	145 43.7%	88 26.5%
c. Woodlands should be left untouched by humans *n=332*	64 19.3%	129 38.9%	98 29.5%	32 9.6%	9 2.7%
d. Harvesting trees is good for the economy *n=330*	16 4.8%	32 9.7%	151 45.8%	105 31.8%	26 7.9%
e. Harvesting trees from a woodland can improve habitat for wildlife *n=329*	6 1.8%	15 4.6%	94 28.6%	156 47.4%	58 17.6%
f. Harvesting trees is sometimes necessary to provide economic profits to woodland owners *n=332*	17 5.1%	30 9.0%	105 31.6%	141 42.5%	39 11.7%

g. When necessary, trees should be harvested from woodlands to prevent forest fires. *n=333*	7 2.1%	23 6.9%	83 24.9%	150 45.0%	70 21.0%
h. Harvesting trees can sometimes be good for a woodland. *n=332*	1 0.3%	6 1.8%	44 13.3%	197 59.3%	84 25.3%
i. Harvested trees should be used to produce products such as paper or lumber that humans can use *n=333*	8 2.4%	20 6.0%	107 32.1%	150 45.0%	48 14.4%

7. Please indicate how important each of the following would be in encouraging you to enroll in a program to manage your woodland for New England cottontail and other wildlife. (frequencies and percentages below)

	Not Important	**Of little importance**	**Somewhat important**	**Very Important**
a. Simplicity of the enrollment process *n=328*	22 6.7%	21 6.4%	121 36.9%	165 50.0%
b. Your land management goals align with the greater goal of wildlife conservation *n=329*	18 5.5%	13 4.0%	119 36.2%	179 54.4%
c. You retain power over decisions made about your land. *n=330*	12 3.6%	4 1.2%	24 7.3%	290 87.9%
d. The program is tailored to my individual needs and motivations for owing woodland *n=328*	12 3.7%	23 7.0%	86 26.2%	207 63.1%
e. Flexibility of the program *n=328*	12 3.7%	16 4.9%	102 31.1%	198 60.4%

8. When it comes to the activities you do on your land, to what extent do you agree or disagree with the following statements? (frequencies and percentages below)

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
a. Managing for New England cottontail and other wildlife habitat is important to **me**. *n=354*	11 3.1%	8 2.3%	96 27.1%	165 46.4%	74 20.9%
b. Managing for New England cottontail and other wildlife habitat is important to **my friends**. *n=351*	10 2.8%	30 8.5%	168 47.9%	108 30.8%	35 10.0%

c. Managing for New England cottontail and other wildlife habitat is important to **my family**. *n=353*	12 3.4%	21 5.9%	121 34.3%	141 39.9%	58 16.4%
d. Managing for New England cottontail and other wildlife habitat is important to **other landowners**. *n=350*	9 2.6%	23 6.6%	201 57.4%	98 28.0%	19 5.4%
e. Managing for New England cottontail and other wildlife habitat is important to **forest and wildlife professionals**. *n=352*	4 1.1%	5 1.4%	93 26.4%	160 45.5%	90 25.6%

HABITAT MANAGEMENT PRACTICES

"ALLOWING OLD FIELDS TO GROW INTO YOUNG FOREST" refers to landowners allowing fields to grow into brush or allowing brush to remain. This practice would involve retiring an old field for a period of roughly 20 years, and may include scattered plantings of shrubs.

9. Have you allowed old fields to grow into forest as a habitat management practice in the past? (frequencies and percentages below)
n=350

☐ Yes *93 (26.6%)* ☐ No *217 (62.0%)* ☐ Not sure *40 (11.4%)*

10. How likely would you be to allow old fields to grow into forest as a habitat management practice to benefit New England cottontail and other wildlife on your land? (frequencies and percentages below)
n=344

VERY UNLIKELY	1	2	3	4	5	VERY LIKELY
	n=102 *29.7%*	*n=33* *9.6%*	*n=90* *26.2%*	*n=64* *18.6%*	*n=55* *16.0%*	

11. How positive or negative do you feel about allowing old fields to grow into forest as a habitat management practice? (frequencies and percentages below)
n=349

VERY NEGATIVE	1	2	3	4	5	VERY POSITIVE
	44 *12.6%*	*32* *9.2%*	*116* *33.2%*	*91* *26.1%*	*66* *18.9%*	

12. To what extent would the following activities encourage you to allow old fields to grow into forest to create habitat for New England cottontail and other wildlife on your woodland?
(frequencies and percentages below)

	Makes no difference	**Might encourage**	**Neutral**	**Likely to encourage**	**Definitely would encourage**
a. Financial incentive that pays landowner about $50/acre *n=336*	130 38.7%	27 8.0%	120 35.7%	36 10.7%	23 6.8%
b. Financial incentive that pays landowner about $75/acre *n=333*	127 38.1%	21 6.3%	117 35.1%	45 13.5%	23 6.9%
c. Financial incentive that pays landowner about $100/acre *n=341*	108 31.7%	31 9.1%	94 27.6%	59 17.3%	49 14.4%
d. Educational workshop about ALLOWING OLD FIELDS TO GROW INTO YOUNG FOREST *n=333*	66 19.8%	38 11.4%	106 31.8%	91 27.3%	32 9.6%
e. Conservation easement (receiving payment for giving up development rights on your land) *n=336*	81 24.1%	38 11.3%	86 25.6%	82 24.4%	49 14.6%
g. Expert advice from a wildlife biologist or other professional *n=335*	52 15.5%	41 12.2%	82 24.5%	87 23.7%	73 21.8%
h. Technical assistance in writing a wildlife management plan *n=332*	67 20.2%	31 9.3%	113 34.0%	72 21.7%	49 14.8%
i. Allowing Dept. of Environmental Conservation (DEC) or partners to perform work on your land at no cost to you *n=331*	64 19.3%	39 11.8%	88 26.6%	79 23.9%	61 18.4%
j. A peer program where you would learn from other landowners *n=334*	73 21.9%	30 9.0%	129 38.6%	70 21.0%	32 9.6%
k. A demonstration area showing the practice on public land *n=333*	58 17.4%	45 13.5%	116 34.8%	72 21.6%	42 12.6%
l. A demonstration area showing the practice on private land *n=332*	59 17.8%	46 13.9%	109 32.8%	80 24.1%	38 11.4%
m. NewEnglandcottontail.org website or other online resources *n=330*	71 21.5%	33 10.0%	131 39.7%	58 17.6%	37 11.2%

n. Rental rate based on agricultural potential of the land *n=327*	74 22.6%	36 11.0%	115 35.2%	68 20.8%	34 10.4%

"**CUTTING TREES"** involves removing trees with the intention of forest betterment, or added benefit to wildlife, and typically focus on increasing light penetration to the forest floor for increased understory growth by carrying out overstory removal. CUTTING TREES could also involve patch cuts--clearing small portions of forest-- to allow trees to grow back (regeneration). Patch cuts create habitat for American Woodcock, Ruffed Grouse, New England cottontail, Golden Winged Warbler and other wildlife. Patch cuts are generally a minimum size of 3-5 acres.

13. Have you used cutting trees as a habitat management practice in the past? *n=330* (frequencies and percentages below)

☐ Yes *53 (16.1%)* ☐ No *248 (75.2%)* ☐ Not sure *29 (8.8%)*

14. How likely would you be to use cutting trees as a habitat management practice to benefit wildlife on your land? *n=330* (frequencies and percentages below)

VERY UNLIKELY	1	2	3	4	5	VERY LIKELY
	n=51	*n=26*	*n=94*	*n=84*	*n=75*	
	15.5%	*7.9%*	*28.5%*	*25.5%*	*22.7%*	

15. How positive or negative do you feel about cutting trees as a habitat management practice? *n=329* (frequencies and percentages below)

VERY NEGATIVE	1	2	3	4	5	VERY POSITIVE
	n=20	*n=23*	*n=107*	*n=94*	*n=85*	
	6.1%	*7.0%*	*32.5%*	*28.8%*	*25.8%*	

16. To what extent would the following encourage you to use cutting trees to create New England cottontail habitat on your woodland? (frequencies and percentages below)

	Makes no difference	**Might encourage**	**Neutral**	**Likely to encourage**	**Definitely would encourage**
a. Financial incentive that pays landowner about $500/acre *n=316*	79 25.0%	36 11.4%	100 31.6%	67 21.2%	34 10.8%
b. Financial incentive that pays landowner about $750/acre *n=317*	74 23.3%	40 12.6%	84 26.5%	84 26.5%	35 11.0%
c. Financial incentive that pays landowner about $1,000/acre *n=324*	55 17.0%	41 12.7%	51 15.7%	81 25.0%	96 29.6%
d. Educational workshop about creating CUTTING TREES *n=318*	56 17.6%	40 12.6%	96 30.2%	84 26.4%	42 13.2%

e. Conservation easement (receiving payment for giving up development rights on your land) *n=323*	71 22.0%	40 12.4%	92 28.5%	76 23.5%	44 13.6%
g. Expert advice from a wildlife biologist or other natural resources professional *n=322*	45 14.0%	48 14.9%	77 23.9%	91 28.3%	61 18.9%
h. Technical assistance in writing a wildlife management plan *n=320*	63 19.7%	39 12.2%	95 29.7%	75 23.4%	48 15.0%
i. Allowing Dept. of Environmental Conservation (DEC) or partners to perform work on your land at no cost to you *n=318*	47 14.8%	50 15.7%	84 26.4%	85 26.7%	52 16.4%
j. A peer program where you would learn from other landowners *n=322*	66 20.5%	39 12.1%	118 36.6%	69 21.4%	30 9.3%
k. A demonstration area showing the practice on public land *n=320*	68 21.3%	38 11.9%	102 31.9%	74 23.1%	38 11.9%
l. A demonstration area showing the practice on private land *n=321*	65 20.2%	41 12.8%	101 31.5%	78 24.3%	36 11.2%
m. NewEnglandcottontail.org website or other online resources *n=314*	70 22.3%	36 11.5%	110 35.0%	60 19.1%	38 12.1%

17. To what extent do you agree or disagree that the following are barriers for managing for New England cottontail on your land? (frequencies and percentages below)

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
a. Rare status of New England cottontail *n=337*	30 8.9%	38 11.3%	168 49.9%	81 24.0%	20 5.9%
b. Not interested in rabbits generally *n=342*	62 18.1%	101 29.5%	121 35.4%	42 12.3%	16 4.7%
c. Difficulty in controlling invasive species (e.g. Multiflora Rose) *n=342*	18 5.3%	32 9.4%	147 43.0%	84 24.6%	61 17.8%
d. Abundance of Eastern cottontail *n=333*	28 8.4%	63 18.9%	187 56.2%	40 12.0%	15 4.5%
e. Potential listing of New England cottontail on the Endangered Species List *n=335*	33 9.9%	53 15.8%	161 48.1%	68 20.3%	20 6.0%
f. Too expensive *n=338*	26 7.7%	49 14.5%	193 57.1%	55 16.3%	15 4.4%

g. Don't know what to do *n=335*	12 3.6%	38 11.3%	160 47.8%	92 27.5%	33 9.9%
h. Not interested in wildlife habitat management generally *n=342*	103 30.1%	118 34.5%	81 23.7%	29 8.5%	11 3.2%
i. Other *n=93*	3 3.2%	3 3.2%	68 73.1%	3 3.2%	16 17.2%

18. Which of the following sources of support and information have you used in the past, and which would you use in the future, to help you make decisions about managing your land for New England cottontail and other wildlife habitat? (frequencies and percentages below)

	Currently use?	**Likely to use in the future?**
a. Government agency (not DEC)	*n=332* Yes *33 (9.9%)* No *299 (90.1%)*	*n=302* Yes *105 (34.8%)* No *197 (65.2%)*
b. Conservation organization	*n=326* Yes *76 (23.3%)* No *250 (76.7%)*	*n=305* Yes *191 (62.6%)* No *114 (37.4%)*
c. Private consultant	*n=329* Yes *32 (9.7%)* No *297 (90.3%)*	*n=303* Yes *77 (25.4%)* No *226 (74.6%)*
d. New York State DEC	*n=329* Yes *64 (19.5%)* No *265 (80.5%)*	*n=311* Yes *166 (53.4%)* No *145 (46.6%)*

BACKGROUND INFORMATION

19. What are the characteristics of the parcel(s) of land you own in Westchester, Duchess, Putnam and/or Columbia counties*?* (descriptives below)

a. How many parcels of land? _____

N	Range	Min	Max	Mean	Variance
339	60	0	60	2.09	14.765

b. How many acres total? _____

N	Range	Min	Max	Mean	Variance
358	4705	0	4705	74.97	69169.778

c. How many acres of wooded land? _____

N	Range	Min	Max	Mean	Variance
342	600	0	600	33.47	3198.229

d. How many acres of grassland/field? _____

N	Range	Min	Max	Mean	Variance
333	450	0	450	23.65	2149.659

e. How many years owned? _____

N	Range	Min	Max	Mean	Variance
357	91	1	92	23.99	307.475

f. How far (miles) do you live from the parcel? _____

N	Range	Min	Max	Mean	Variance
327	2500	0	2500	40.30	44769.956

20. Are you a member of a wildlife conservation organization? *n=361* (frequencies and percentages below)

☐ Yes *n=76 (21.1%)* ☐ No *n=285 (78.9%)*

20a. If yes, which one(s) are you actively involved with?

21. Are you Male or Female? *n=362* (frequencies and percentages below)

☐ Male *n=200 (55.2%)* ☐ Female *n=162 (44.1%)*

22. In what year were you born? _____

N	Range	Min	Max	Mean	Std. Dev.	Variance
341	77	1917	1994	1951	12.196	148.731

23. What is the highest level of education you have completed? *n=357* (frequencies and percentages below)

☐ Less than high school *3 (0.8%)*

☐ High school diploma/ G.E.D. *30 (8.4%)*

☐ Some college or technical school *65 (18.2%)*

☐ Associate's degree *22 (6.2%)*

☐ College undergraduate degree (e.g. B.S., B.A.) *107 (30.0%)*

☐ Graduate or professional degree (e.g. M.S., Ph.D., M.D, J.D.) *130 (36.4%)*

Please use the space below for any comments you wish to make

Thank you for your time and effort!

To return this questionnaire, simply seal it with the white removable seal, and drop it in the mail (return postage has been paid).